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AN INTRODUCTION TO THE USE OF THE ARMY UNIT RESILIENCY ANALYSIS (AURA) METHODOLOGY: VOLUME I

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September 1984

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As a result of the increased application of the Army Unit Resiliency Analysis (AURA) methodology in a variety of studies conducted by a number of agencies, it became evident that a user's introduction to the code was needed. This report is the first of two volumes designed to meet that need. This report is intended to demonstrate the use of the code, which is accomplished by a progression of examples in which a hypothetical unit is described and played through a series of events. This volume is designed to take the user through

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the functional and organizational description of the unit, reliability failures, organizational repair and use of conventional munitions and conventional lethality. The use of chemical and nuclear weapons, and their corresponding inputs, will be presented in Volume II.

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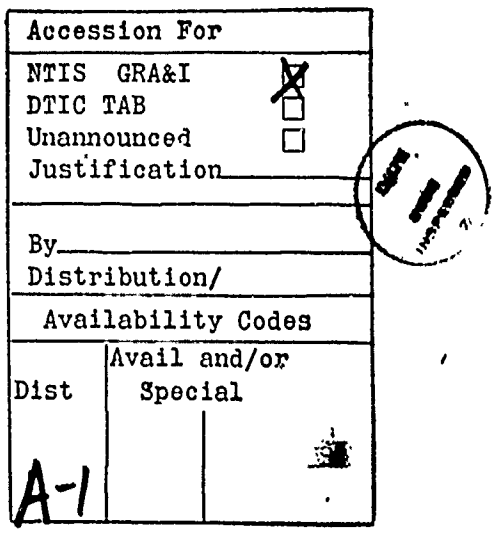

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I. INTRODUCTION

A. Scope

The Army Unit Resiliency Analysis methodology, AURA (formerly called Residual Combat Capability [RCC]), is an amalgamation of analysis techniques, algorithms, and data sources gathered from the laboratories that specialize in the various areas which impact upon the resiliency of a military unit. There are many such areas - unit organization and operation, cross-training, vulnerabilities, and threats, to name a few. As a result of its breadth and versatility, AURA is finding application in a variety of studies conducted by a number of agencies. This growth in the number of ongoing studies is increasing the number of analysts who conduct AURA studies and who, therefore, must learn to run the code. This report is intended as a primer for those analysts. However, in showing some of the inputs, outputs, and functions of AURA, this report will also give a better operational understanding of the methodology to those needing more than the overview level of knowledge given by References 1 through 5.

AURA was, from its inception, anticipated for multi-agency use. Therefore, a great deal of effort was spent in making the main program as user-oriented as possible. Specific steps taken include: mnemonically keyed, free-field, English word inputs; extensive checks and diagnostics; machine independent coding (standard FORTRAN-77); and

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[1] J.T. Klopcic, et al, "RCC: A Methodology/Code to Model Residual Combat Capability at the Unit Level," Ballistic Research Laboratory, Technical Report No. ARBRL-TR-02156, April 1979, (UNCLASSIFIED), AD B037451L.

[2] J.T. Klopcic, et al, "RCC: A Methodology/Code to Model Residual Combat Capability at the Unit Level," Addendum to Reference 1, Ballistic Research Laboratory, Technical Report No. ARBRL-TR-02196, September 1979, (UNCLASSIFIED), AD B042085L.

[3] J.T. Klopcic and M.A. McDonald, "RCC Methodology/Code Extensions (JUL 80): Failure Model, Repair/Return, Augmented I/O and Division-Level Interfacing," Ballistic Research Laboratory, Technical Report No. ARBRL-TR-02275, December 1980, (UNCLASSIFIED), AD A095346.

[4] J.T. Klopcic and J.J. Baldauf, "The BRL Chemical Protection Degradation Model: The Degraded Effectiveness Algorithm, Degradation Matrix and 'MOPPDAT' Individual Performance Database," Ballistic Research Laboratory, Draft Report, (UNCLASSIFIED).

[5] J.T. Klopcic and J.C. Maloney, "New Nuclear Vulnerability Database, Input Format and Supporting Software for RCC," Ballistic Research Laboratory, Memorandum Report No. ARBRL-MR-03001, March 1980, (UNCLASSIFIED), AD A084982.

development of data sets to allow "black-box" operation of many of the code areas. However, like any tool, AURA still requires the user to have some basic acquaintance with its structure and operation before he can meaningfully begin to conduct runs. We feel that such acquaintance is most easily and clearly gained by "following through" some illustrative examples and have therefore built this report around a series of such examples.

The format of the report is as follows. A hypothetical unit with a corresponding mission is modeled in the first section. This unit is then put into a number of example situations in the following sections. In each section, the addition being made to the scenario, the corresponding additions to the runstream, and the resulting changes in output are presented.

B. AURA Formats

Every line of AURA input is in one of the following three forms: all words/names or sets of words, separated by commas; one word/name followed by commas and numbers; or all numbers. Numbers may be integers or reals, as required by the specific input: presence of a decimal point in a number is necessary and sufficient to indicate a real number. Exponential forms (e.g. 1.E6) are acceptable as reals. AURA reads all inputs as a string of 80 characters, and then breaks the string down into its components. In the process, all names and sets of words are left justified. Numbers need not be placed into any particular columns, but merely entered in the required order, and separated by blanks or commas. Names and sets of words, which may include imbedded blanks, must be separated from subsequent names, sets of words, or numbers by commas.

The dollar sign, $, is a special character in an AURA input line. A dollar sign in the first column has the following uses:

1. The card is an additional, optional input associated with the preceding card (e.g. substitutes for a subtask (LINK) which are optional, are entered on a card headed by a $ which follows the LINK description card.)

2. The card is a continuation of the preceding card (i.e. the list of words or numbers being input did not all fit on the preceding card.)

The "tic-tac-toe" sign, #, is also a special character which causes any information that follows (on the same card) to be ignored. This feature allows the user to insert comments in his runstream for his own use. For example, in the following set of cards

```
LINKS
 # THESE SUBTASKS REFLECT THE DIV 86 0 & 0
 MANUAL FDSET, 1., 25 # SLOW BACKUP FOR FADAC
```

card 2 will be completely ignored, while the scan on card 3 will cease after the "25."

II. RUN # 1 - DEBUG

It is often convenient in running a computer code to allow the code to test the inputs, detect errors and report on ambiguities without attempting to execute. In AURA, this feature is called DEBUG and is one of the options under the MODE mnemonic. In this section, we begin a series of example analyses by presenting an example unit and developing the AURA inputs which describe the unit. Then, using the DEBUG option, we test the inputs.

A. The Example Unit

In AURA, a unit is described physically and functionally. The physical description consists of the elements and personnel, as would be listed in a table of organizations and equipment (TO&E). The functional description is the mission of the unit, the subtasks that must be done to accomplish the mission, and the relationships between the tasks.

For this report, the example unit is a small, hypothetical supply unit. The mission of the unit is to load trucks on order at a certain ratio. Two classes of items, heavy and light, are to be loaded: the heavy items, which comprise 25 percent of each load, must be loaded with a crane; the light items can be loaded by hand or by forklift. The order to fill the trucks is received by radio or telephone. Personnel are required to receive the order, man the forklift and crane teams, drive the truck, and handload if required. Handloading, however, can never accomplish more that 65 percent of the required rate.

There is also a loadmaster, who supervises the operation. However, the unit has functioned together long enough to work at 75 percent of the required rate even if the loadmaster's job is not done.

For this scenario, the elements of the unit are deployed as shown in Figure 1. Note that the coordinate system used is an arbitrary choice of the user. The deployment establishes what we refer to as the TARGET COORDINATE system, in which all locations are specified. The unit of length is also arbitrary; however, the unit chosen must be used consistently in all inputs, including such decisive inputs as toxic chemical dispersion, target location errors, and lethal radii for munitions. As a standard practice, meters (length) and a convenient time unit (minutes) are recommended.

Although not shown in Figure 1, each item, or set of items, has conventional, nuclear, and toxic kill criteria associated with its deployment: these criteria specify the level of damage required to render the item deployed at that point incapable of performing the task to be done at that point. Each item is also given conventional, nuclear, and toxic postures, which are not shown in Figure 1.

Finally, AURA deployments define those locations at which tasks which are not originally staffed would be done if needed. An example of

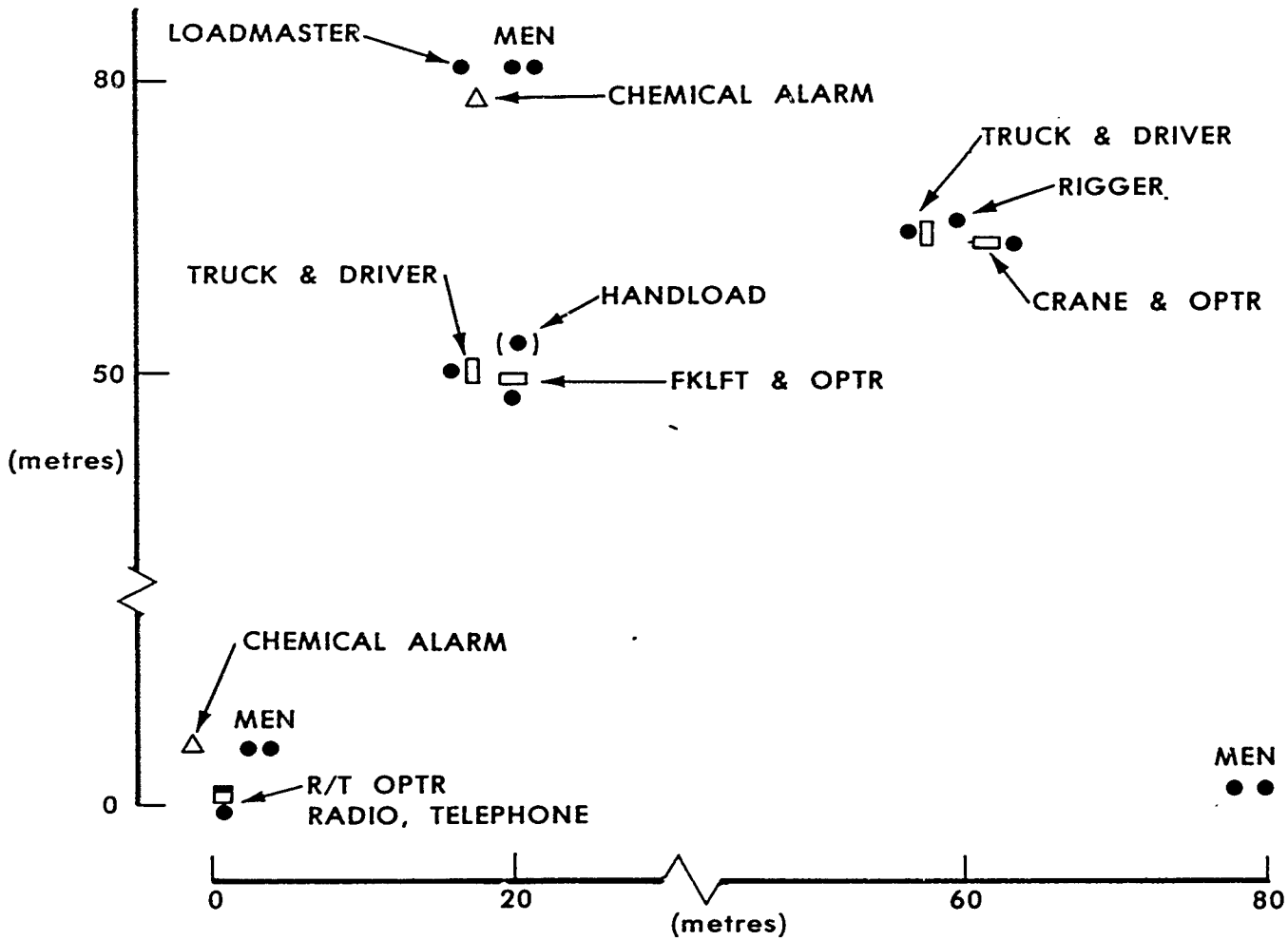

Figure 1. Example of a Unit Deployment

such a task, called a "dummy link," is the handloading job. As described above, if it is more effective to load the light items by forklift, handloading will not be done. If handloading is required, however, it will be done where shown. Dummy links are discussed in more detail in Section IX.A.

The code inputs to create this deployment are described in the following sections.

B. REPERTOIRE

One of the necessary features of a user-friendly code is a readable input stream. The user should be able to refer to items by name throughout his input instructions. This feature requires, however, that the code knows which words (or sets of words) are names of items, as opposed to names of commands. In AURA, a great deal of efficiency is achieved by having the user teach the code the names of items (which AURA calls assets) and weapons. This is done following the mnemonic REPERTOIRE. The REPERTOIRE inputs for the example case are shown in Figure 2.

The REPERTOIRE inputs serve another extremely useful purpose. Often, many assets or weapons will share some common characteristics. For example: any person may have the same vulnerability as any other who is in the same job in the same location; a given warhead will have the same lethality (for the same terminal orientation, height-of-burst, etc.) regardless of the delivery system which delivered it; and any truck is substitutable for the messenger vehicle. The REPERTOIRE input allows attaching additional, common names to various assets and weapons. In the subsequent inputs, those items with common characteristics can be referred to as a group by use of their common name. Referring to Figure 2, the example case gives the common name TRK to TRUCK and CRANE, and TALKY to RADIO, ALARM, and TELE. All personnel are designated PERSONNEL.

Finally, it should be noted that every asset and weapon must have one unique name, since certain inputs, such as DEPLOYMENT, require specification of a particular item. Assets may have more than one unique name; however, additional unique names are wasteful and could be confusing if used in conflict with each other and therefore trigger a warning message.

C. Runstream Organization

Before continuing with the input for RUN # 1, a few general comments on AURA runstream organization are in order.

1. Blocks of information are headed by a mnemonic card, which indicates the type of data which is coming. An example of a mnemonic is the REPERTOIRE card discussed above, which indicates that asset and weapon names follows.

```
#THIS IS THE INPUT FOR RUN #1
REPERTOIRE
FGS
TRUCK,TRK
FKLFT
CRANE,TRK
RADIO,TALKY
ALARM,TALKY
TELE,TALKY
R/T OP, PERSONNEL
LOADMSTR, PERSONNEL
DRIVER, PERSONNEL
MEN, PERSONNEL
FKLFT OP, PERSONNEL
CRANE OP, PERSONNEL
RIGGER, PERSONNEL
#, ANY RUN WHICH EMPLOYS WEAPONS ( REF. OTHER EXAMPLES IN THIS REPORT )
# MUST LIST WEAPON NAMES AFTER A "WEAPON" CARD IN THE REPERTOIRE
END  # THIS END CARD IS ESSENTIAL
# NOTE THE USE OF THE # SIGN TO INPUT COMMENTS TRANSPARENT TO THE CODE
```

Figure 2. REPERTOIRE for the Example Case

2. A block of information is ended by an END card. The input route will attempt to fill in omitted END cards (after giving a warning). However, the REPERTOIRE END card is absolutely essential.

3. The REPERTOIRE must come first, since knowledge of the names is needed for subsequent inputs. However, following the REPERTOIRE END card, blocks of information can be input in any order.

4. All inputs use the special interpretive input routines described in Section I.B. of this report.

5. A list of all mnemonics and a brief description of the information block which follows is kept on a computer file. A printout of the file is contained in Appendix A.

It is recommended that the user refer to Appendix A throughout this report.

D. Deployment

The unit deployment (Figure 1) is input to AURA via the lines shown in Figure 3. Referring to Figure 4, which contains one line from Figure 3, one sees that the first entry is the name of the item being deployed, as it first appeared in the Repertoire. The second and third entries are the X and Y coordinates of the deployment point and the fourth entry is the "average" number of FKLFT OPs located there.

Two sets of three code numbers complete the card. The first set gives the conventional, nuclear, and toxic kill criteria for a FKLFT OP at this point. The second set gives the initial conventional, nuclear, and toxic postures for the FKLFT OP. These codes relate such elements as vulnerability data and job difficulty to an item deployed at this point; precise definition of the codes will be given within the following sections when discussing the pertinent elements.

Appendix A lists a number of options and defaults which could be used with the DEPLOYMENT input. Some, like posture-change-under-fire, will be added as a more complex scenario is developed.

```
DEPLOYMENT
R/T OP, 0.,0., 1.,1,1,2,1,1,0
RADIO, 0.,0.,1.,1,1,1,1,1,0
ALARM, 0.,0.,1.,1,1,1,1,1,0
TELE, 0.,0.,1.,1,1,1,1,1,0
MEN, 0.,1.,2.,1,1,1,1,1,1
TRUCK, 20.,50.,0.6,1,1,1,1,1,0
DRIVER,20.,50.,0.6,1,1,3,1,1,0
FKLFT, 20.,50.,1.,1,1,1,1,1,0
FKLFT OP, 20.,50.,1.,1,1,3,1,1,0
HANDLOAD,20.,50.,-5.,1,1,4,1,1,0  # THIS IS A DUMMY LINK.
# THE - SIGN ABOVE IS OPTIONAL. SINCE HANDLOAD ISN'T IN THE REPERTOIRE,
# THE CODE KNOWS HANDLOAD IS A DUMMY LINK.
LOADMSTR,20.,80.,1.,1,1,5,1,1,0
MEN,20.,80.,2.,1,1,1,1,1,1
ALARM, 20.,80.,1.,1,1,1,1,1,0
CRANE,60.,60.,1.,1,1,1,1,1,0
CRANE OP,60.,60.,1.,1,1,3,1,1,0
TRUCK,60.,60.,0.4,1,1,1,1,1,0
DRIVER,60.,60.,0.4,1,1,3,1,1,0
RIGGER,60.,60.,1.,1,1,4,1,1,0
MEN,80.,0.,2.,1,1,1,1,1,1
END
```

Figure 3. DEPLOYMENT Input for the Example Case

```
FKLFT   OP,   20.,   50.,   1.,   1, 1, 3,   1, 1, 0
```

Item name	X	Y	No. Here	Kill Criteria Codes	Initial Posture Codes

Figure 4. One Line from the Deployment (Figure 3)

E. Links

The subtasks which can be performed by elements of the example unit were described during the description of the unit in Section II. A. In AURA, the effectiveness of subtask performance is quantified, in terms of the effective assets allocated to each subtask, via link-effectiveness curves.

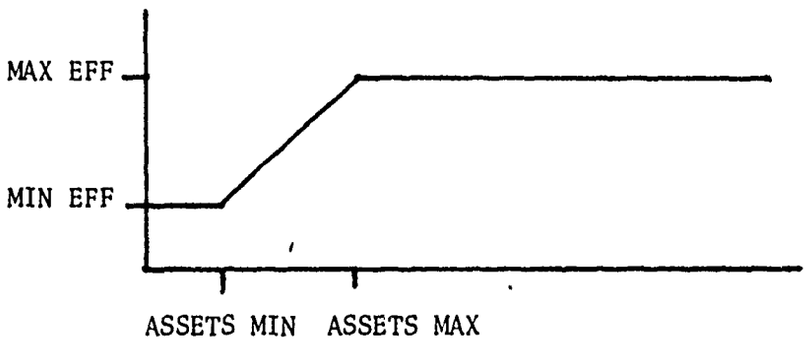

Figure 5. A Generalized Link-Effectiveness Curve

A generalized link-effectiveness curve is shown in Figure 5. It is clear that four numbers are required to specify the generalized curve; viz.: MAX EFF (the maximum attainable effectiveness), ASSETS MAX (the

corresponding numbers of assets required for MAX EFF), MIN EFF (the minimum effectiveness), and ASSETS MIN (the corresponding assets for MIN EFF). These four numbers are input to AURA for each job via the LINKS input. An additional parameter, ENT MAX, is available to limit the number of entities which can engage in a particular task, e.g., there can be only one commander, two gunners per howitzer, etc. The format for LINKS input is given in Appendix A.

The link-effectiveness curves for the example unit are shown in Figure 6. The specific LINKS input to describe the curves of Figure 6 is represented in Figure 7.

The importance and versatility of the LINKS input merit further discussion here. First, as noted in Appendix A, the general format for the input of the four numbers is:

LINK NAME, ASSETS MAX, MAX EFF, ENT MAX,
$M, ASSETS MIN, MIN EFF

NOTE: MAX EFF and MIN EFF must be input as percents and must be integers (no decimal points) between 1 and 100. The remaining numbers must be reals (with decimal points).

It has been found, however, that most subtasks have the following simple description: given enough assets, the job effectiveness is 100 percent; as the assets go to zero, so does the effectiveness. The majority of links in Figure 6 fit this description. It was therefore decided to adopt default values to simplify the input of such links.

PARAMETER	DEFAULT
MAX EFF	100%
MIN EFF	0%
ASSETS MIN	0.
ENT MAX	unlimited

With these defaults, a LINKS input reduces to

LINK NAME, ASSETS MAX, ENT MAX

for an entity limited link, and

LINK NAME, ASSETS MAX

for an unlimited link. LOADMSTR and TRUCK in Figure 7 are examples of such inputs.

The LINKS input is also used to input other information pertinent to the accomplishment of subtasks. The normal link is named after the

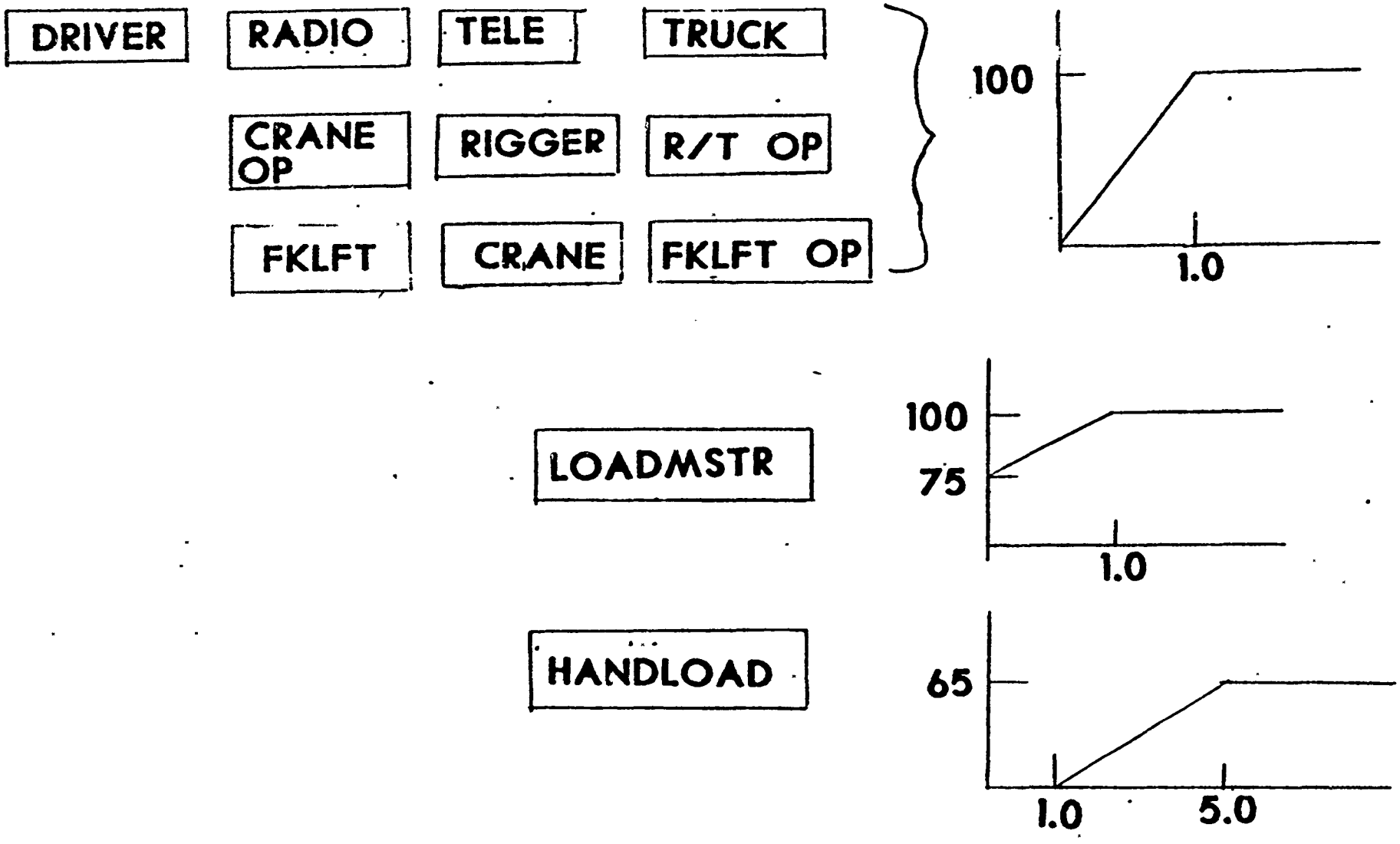

Figure 6. Link-Effectiveness Curve for the Example Case

```
LINKS
DRIVER, 1., 1.
$A, TRUCK
$PERSONNEL
$T,15.
$E,.85
RADIO,1.0
TELE,1.0
TRUCK,1.0
CRANE OP,1.0,1.0
$A,CRANE
$FKLFT OP, RIGGER, LOADMSTR
$T, 10., 5., 5.
$E, 0.8, 0.5, 1.0
RIGGER, 1.0
$PERSONNEL
$T, 5.
$E, 0.6
R/T OP, 1.0, 1.0
$LOADMSTR,PERSONNEL
$T,20.,15.
$E, 1.0, 0.8
FKLFT, 1.0
CRANE, 1.0
FKLFT OP, 1.0, 1.0
$A, FKLFT
$CRANE OP, LOADMSTR, PERSONNEL
$E,0.9, 1.0, 0.2
$T, 10., 5., 5.
LOADMSTR, 1., 2.
$M,75
HANDLOAD, 5.0, 65
$M,1.0
$PERSONNEL
$E,1.
$T,5.
END
```

Figure 7. LINKS Input for the Example Case

functional group whose primary job is the link subtask. For example, the RIGGER and RADIO links have the same names that were given (in the REPERTOIRE) to the RIGGER person and RADIO piece of equipment. Whenever a link has the same name as an asset, AURA automatically assumes: that items of the asset can be assigned to do the link subtask; that such items need no time to get into the job; and that, if not otherwise degraded, such items can perform at an effectiveness of 1. (i.e., by members of functional groups other than the one for whom the link is named). Substitutes are named on a card beginning with a dollar sign ($), which follows a link card. For example, in Figure 7, the R/T OP link contains the following lines.

```
R/T OP, 1.0, 1.0
$LOADMSTR, PERSONNEL
$T, 20., 15.
$E, 1.0, 0.8
```

These cards give AURA the following information about the R/T OP job:

a. The normal performer of the job is the person called R/T OP (as listed in the REPERTOIRE).

b. One person is sufficient for 100 percent performance.

c. A maximum of one person can do the job.

d. The person called LOADMSTR in the REPERTOIRE can be substituted into the job, as can everyone having the additional name PERSONNEL.

e. The LOADMSTR requires 20 minutes to get into the job. Other PERSONNEL require 15.

f. The LOADMSTR can perform at effectiveness 1. (as well as the R/T OP himself), whereas other PERSONNEL can be at best .8.

The last two pieces of information (e. and f.) came from the cards headed $T and $E.

These cards (either one first) MUST follow every substitution card, and contain an effectiveness and substitution time for each asset name on the substitution card.

The final link option shown in Figure 7 is the associated link. For example, the DRIVER link has the following cards:

```
DRIVER, 1., 1.
$A, TRUCK
$PERSONNEL
$T, 15.
$E, .85
```

Normally, the value of ENT MAX (the second one on the DRIVER card) is taken as an absolute number. An absolute ENT MAX would mean that a maximum of one driver could be used. (This prevents using two ineffective substitutes as an effective replacement for one good driver.) However, in actuality, the maximum number of drivers depends on the number of items assigned to the TRUCK subtask. To input this information, the user can "associate" the TRUCK link to the DRIVER by using the $A card. The effect of including the $A card is to cause AURA to interpret the ENT MAX number as relative to the items available in the associated LINK. In the DRIVER example, upon reading the $A card, AURA interprets the second one on the DRIVER card as meaning " a maximum of one per TRUCK." On the other hand, the R/T OP example above, which had ENT MAX = 1 but no $A card, is interpreted as "a maximum of one person can be assigned to this job, regardless of any other LINKS."

F. SUBCHAINS

Some jobs require more than one link subtask to be performed in order to achieve any results. For example, the crane AND the crane operator AND the rigger jobs must be done to have crane capability. In AURA, the construction used to show an AND relationship between links is the SUBCHAIN. The subchains used for the example unit are shown in Figure 8. The inputs used to generate them are shown in Figure 9.

Note that subchain names must be of the form *N, where N is an integer between 1 and 26.

G. ORLINKS

Situations occur in which a choice can be made between two or more procedures in order to accomplish a task. For example, a unit might choose between radio OR telephone communications to receive a message. In AURA, the exclusive OR relationship between procedures is input via the ORLINK construction. The orlinks used for the example unit are shown in Figure 10. The inputs used to generate them are shown in Figure 11.

Note that orlink names must be of the form +N, where N is an integer between 1 and 23.

H. Compound Links

Another possible relationship between combinations of subtasks is that in which each combination independently contributes a part of a larger segment of work. In the example unit, the crane team contributes 25 percent to the overall truck loading, while the light item loading (forklift team or handloading) contributes 75 percent. This relationship, in which each procedure contributes an additive part to a larger task, is modeled in AURA as a COMPOUND LINK. The compound link used for the example unit is diagramed in Figure 12. Notice that the compound link is made up of subchains, links, and orlinks described in the preceding sections. The inputs used to generate the compound link are shown in Figure 13.

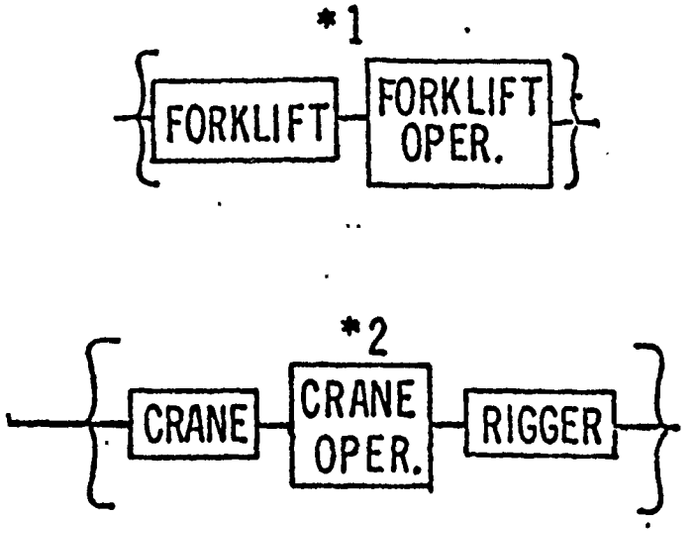

Figure 8. SUBCHAINS from the Example Case

```
SUBCHAINS
*1, FKLFT, FKLFT OP
*2, CRANE, CRANE OP, RIGGER
END
```

Figure 9. SUBCHAIN Input for the Example Case

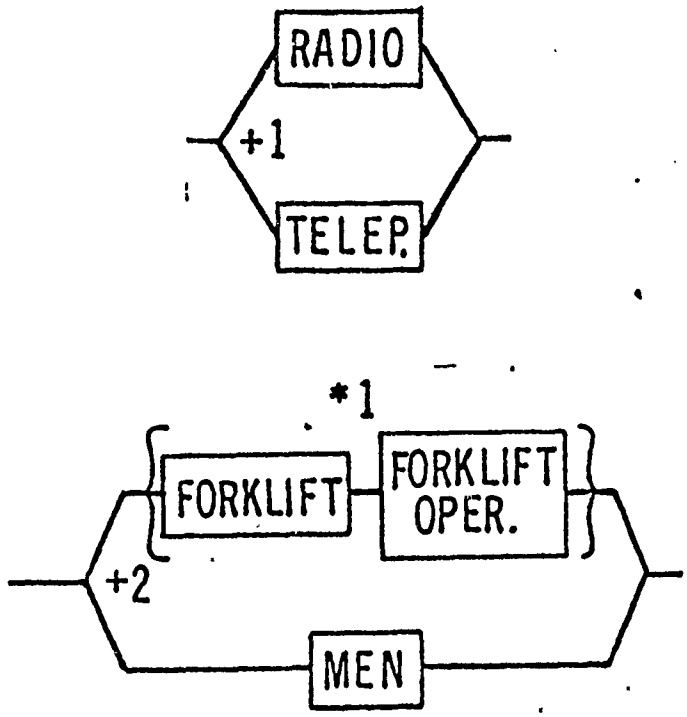

Figure 10. ORLINKS from the Example Case

```
ORLINK
+1, RADIO, TELE
+2, *1, HANDLOAD
END
```

Figure 11. ORLINK Input for the Example Case

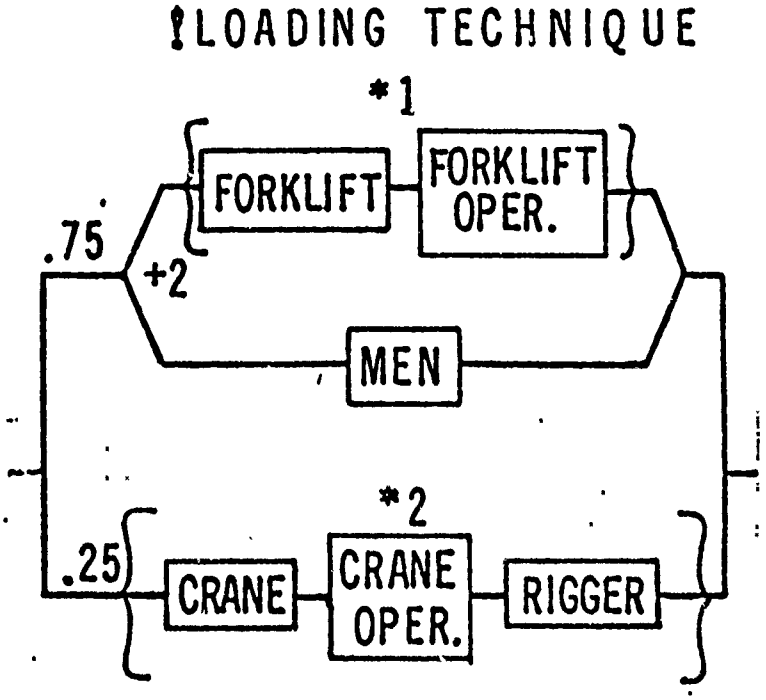

Figure 12. COMPOUND LINK from the Example Case

```
COMPOUND LINK
!LOADING TECHNIQUE
+2, 0.75
*2, 0.25
END
```

Figure 13. COMPOUND LINK inputs for the example case

Note that the compound link name begins with an exclamation sign (!).

I. CHAINS

Finally, the various functions of a unit must be combined into one or more overall procedures in order to accomplish the unit mission. This final, overall combination is in the form of a series of ANDs. In the example case, the unit must have communication equipment AND communication people AND loading capability AND a truck to load AND .... In AURA, this final compilation of major functions is called a CHAIN. As shown in subsequent sections, a unit may have several chains which are simultaneously operant (AURA chooses the most effective) or sequentially operant to model mission changes with time. However, for this initial example, only one chain was needed; it is shown in Figure 14. The inputs to create the chain are presented in Figure 15.

```
CHAINS
R/T OP, +1, !LOADING TECHNIQUE, TRUCK, LOADMSTR
END
```

Figure 15. CHAIN input for the example case

Note that chains need no name. In runs involving more than one chain, results are output by chain in the order of input.

J. Comments on Functional Structure

Since the performance of, and relationship between, individual tasks is one the most complicated facets of any joint human venture, it is inevitable that a realistic, yet general, tool for modeling a unit must itself appear complicated. The approach taken in constructing the functional structure and associated optimization portions of AURA was to isolate and quantify subtasks, and then describe the relationship between them. This approach appears to fit well with the way that unit personnel think of their units. We have therefore found it easy to model units using information gathered through asking field experienced people to answer straightforward questions:

1. What tasks were done in your unit?

2. Who did them?

3. How well/and how fast?

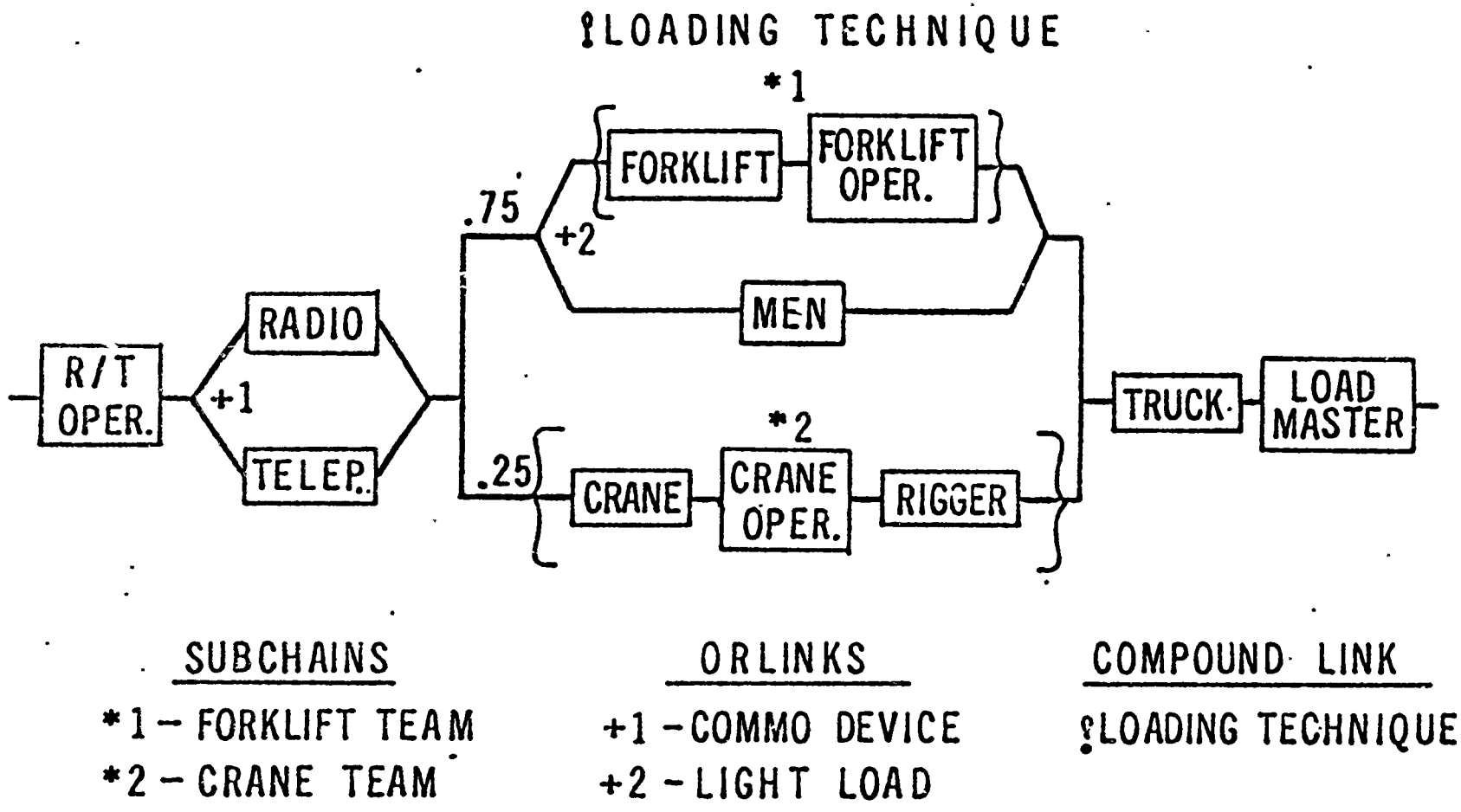

Figure 14. The Initial CHAIN for the Example Case

4. What was the task flow, i.e., where did a job normally start? Where did it go from there? etc.

5. Are there variations on the above?

The answers to these questions can be put straight into parameters for links, subchains, etc. A bonus in this approach is the intuitive shape of the result: the chain in Figure 14 "looks like" the operation of the unit.

K. Control Instructions and Final Runstream

The final inputs for the example case are those that set the mode to DEBUG (described in the introduction to Section II), and input a heading for the output. The GO card informs the code that all input has been received and the analysis can begin. After completing the analysis, AURA again returns to the runstream for further instructions. The STOP card indicates that no instructions follow and that the file closing and run termination routines can be called.

The entire runstream for the example case is presented in Figure 16.

L. Execution of an AURA Run.

Currently, all AURA runs are done in 'batch' mode, i.e., with all instructions and data assembled before execution of the program. It is quite convenient, at most computer facilities, to assemble the runstream (Figure 16) in a file, using local editing procedures. Such a file can then be attached to AURA runs. To facilitate this process, the AURA code begins by reading, from INPUT, the name of the file containing the runstream. Optionally, it will also read a comment line which is to be printed at the top of output. It then transfers all input READs to the named file until the program stops.

Although the executive language used by each computer manufacturer is different from all others, a generic example of an execution stream can be given (Figure 17).

```
<Executive command section>
ATTACH runstream with (local) FILENAME
EXECUTE AURA
<Input data section>
FILENAME
Comment for addition to Heading
```

Figure 17. Generic Execution STREAM

III. ORGANIZATION AND CONTROL OF OUTPUT

Analyses involving the AURA methodology can generate prohibitively large amounts of various kinds of data. It is possible, for example, to

```
#THIS IS THE INPUT FOR RUN #1
REPERTOIRE
FGS
TRUCK,TRK
FKLFT
CRANE,TRK
RADIO,TALKY
ALARM,TALKY
TELE,TALKY
R/T OP, PERSONNEL
LOADMSTR, PERSONNEL
DRIVER, PERSONNEL
MEN, PERSONNEL
FKLFT OP, PERSONNEL
CRANE OP, PERSONNEL
RIGGER, PERSONNEL
# ANY RUN WHICH EMPLOYS WEAPONS ( REF. OTHER EXAMPLES IN THIS REPORT )
# MUST LIST WEAPON NAMES AFTER A "WEAPON" CARD IN THE REPERTOIRE
END  # THIS END CARD IS ESSENTIAL
# NOTE THE USE OF THE # SIGN TO INPUT COMMENTS TRANSPARENT TO THE CODE
DEPLOYMENT
R/T OP, 0.,0., 1.,1,1,2,1,1,0
RADIO, 0.,0.,1.,1,1,1,1,1,0
ALARM, 0.,0.,1.,1,1,1,1,1,0
TELE, 0.,0.,1.,1,1,1,1,1,0
MEN, 0.,1.,2.,1,1,1,1,1,1
TRUCK, 20.,50.,0.6,1,1,1,1,1,0
DRIVER,20.,50.,0.6,1,1,3,1,1,0
FKLFT, 20.,50.,1.,1,1,1,1,1,0
FKLFT OP, 20.,50.,1.,1,1,3,1,1,0
HANDLOAD,20.,50.,-5.,1,1,4,1,1,0  # THIS IS A DUMMY LINK.
# THE - SIGN ABOVE IS OPTIONAL. SINCE HANDLOAD ISN'T IN THE REPERTOIRE,
# THE CODE KNOWS HANDLOAD IS A DUMMY LINK.
LOADMSTR,20.,80.,1.,1,1,5,1,1,0
MEN,20.,80.,2.,1,1,1,1,1,1
ALARM, 20.,80.,1.,1,1,1,1,1,0
CRANE,60.,60.,1.,1,1,1,1,1,0
CRANE OP,60.,60.,1.,1,1,3,1,1,0
TRUCK,60.,60.,0.4,1,1,1,1,1,0
DRIVER,60.,60.,0.4,1,1,3,1,1,0
RIGGER,60.,60.,1.,1,1,4,1,1,0
MEN,80.,0.,2.,1,1,1,1,1,1
END
LINKS
DRIVER, 1., 1.
$A, TRUCK
$PERSONNEL
$T,15.
$E,.85
RADIO,1.0
TELE,1.0
```

Figure 16. The Initial Runstream for the Example Case

```
TRUCK,1.0
CRANE OP,1.0,1.0
$A,CRANE
$FKLFT OP, RIGGER, LOADMSTR
$T, 10., 5., 5.
$E, 0.8, 0.5, 1.0
RIGGER, 1.0
$PERSONNEL
$T, 5.
$E, 0.6
R/T OP, 1.0, 1.0
$LOADMSTR,PERSONNEL
$T,20.,15.
$E, 1.0, 0.8
FKLFT, 1.0
CRANE, 1.0
FKLFT OP, 1.0, 1.0
$A, FKLFT
$CRANE OP, LOADMSTR, PERSONNEL
$E,0.9, 1.0, 0.2
$T, 10., 5., 5.
LOADMSTR, 1., 2.
$M,75
HANDLOAD, 5.0, 65
$M,1.0
$PERSONNEL
$E,1.
$T,5.
END
SUBCHAINS
*1, FKLFT, FKLFT OP
*2, CRANE, CRANE OP, RIGGER
END
ORLINK
+1, RADIO, TELE
+2, *1, HANDLOAD
END
COMPOUND LINK
!LOADING TECHNIQUE
+2, 0.75
*2, 0.25
END
CHAINS
R/T OP, +1, !LOADING TECHNIQUE, TRUCK, LOADMSTR
END
MODE
DEBUG,ON
END
HEADING
FIRST EXAMPLE RUN - DEBUG
END
GO
STOP
```

Figure 16. The Initial Runstream for the Example Case (con't)

print out the impact point of every incoming round: for 100 replications of a study involving a heavy artillery barrage, the impact point print-out alone could consume 10,000 pages of computer paper. For this reason, AURA is equipped with print options (see the OUTPUT instructions in Appendix A), by which the user selects the entities he wishes printed. When no options are invoked, the defaults in AURA result in a moderate amount of print-out which includes a consolidation of the inputs and a report of the final, average results at each time point. For this first example case, no output options were invoked.

It is also useful to have a feeling for the organization of the output. That organization is outlined in Table 1.

TABLE 1. OUTLINE OF AURA OUTPUT

I. CONSOLIDATION of INPUTS

- A. Mnemonic control cards
- B. Heading
- C. Event-table and miscellaneous
- D. Weapons
  1. Names, yields, delivery errors
  2. Dispersion pattern envelope (TOXIC rounds)
- E. Assets
  1. Names, numbers, and other accounts
  2. Degradation information
  3. Reliability and repair data
- F. Link Definition Table
- G. Link-Assets Substitutability Matrix
- H. Subchains, Orlinks, Compound Links, and Chains
- I. Chain Plots
- J. Deployment Table
- K. Deployment Plots

II. Intermediate Results

As requested:

- A. Weapon actual ground zeroes
- B. Casualties, contaminations

C. Dosages

D. Repairs begun, completed

E. Asset allocation decisions, shortcomings

F. Replication summaries

III. Final Results vs. time

A. Effectiveness, statistics, and distribution

B. Functional groups

1. Survivors
2. Dosages
3. Contaminations

C. LINK Result Table

D. CHAIN Results

IV. At-End Averages

Certain at-end statistics, such as repair results, reliability failures, etc.

V. Repeat of Lethality, Vulnerability, and Dissemination Files

In addition, outputs may contain a number of information, warning, or error messages.

IV. OUTPUT #1

A. Mnemonic Control Cards

Figure 18 contains the mnemonic control card output from the example case. This section is printed during the actual reading of input. (All other output follows the initial pre-processing of input data.) This procedure results in an audit to the input processing: if a fatal error occurs during input, the user can immediately tell which input data type caused the problem.

Comparing Figure 18 with Figure 16, one notes that the numbered lines in the output correspond to the mnemonics in the input. Notice, too, that informative warning lines were inserted, all prompted by the use of the dummy link HANDLOAD. First, during deployment, the input routine found that HANDLOAD had not been identified as an asset. AURA therefore assumed that it was a dummy link. Since the LINK input had not yet been processed, the deployment routine initiated the dummy link definition and printed the informative warning.

```
MNEMONIC CONTROL CARDS
**********************

        1.  DEPLOY

*!*!* WARNING *!*!*  COULD NOT FIND FG OR LINK NAMED HANDLOAD              DUMMY LINK CREATED
        2.  LINKS
FNCTNL GRP REPERTOIRE DOES NOT INCLUDE HANDLOAD
*** WARNING *** LINK HANDLOAD            HAS NO CORRESPONDING FG  - ASSUMING DUMMY LINK
        3.  SUBCHA
        4.  ORLINK
        5.  COMPOU
        6.  CHAINS
        7.  MODE
        8.  HEADIN
        9.  GO
```

Figure 18. The Mnemonic Control Card Output from the Example Case

Likewise, during link input, AURA recognized that HANDLOAD is not a link which is named after its primary performer; this resulted in the message that HANDLOAD does not appear in the REPERTOIRE, and that a dummy link is assumed. The match up between links and deployment is made after all inputs have been read. Thus, the order of these inputs is immaterial.

B. Heading, Event Table and Miscellaneous

Figure 19 contains the heading, event table, and miscellaneous information. Since this run, in the DEBUG mode, involved no events (incoming warheads arriving, reconstitutions, etc.), there are no entries in the event table.

The columns of the event table give the following information as appropriate for each particular event.

EVENT number

TIME of event occurrence

EVENT TYPE - such as "lethality" or "reconstitution"

OPERANT CHAIN - the unit functional structure available to the commander at this event time

WPN TYPE - weapon number (lethality events only)

RECUPTIME - time for substitution (reconstitution events only)

NO. RNDS - number of rounds in volley (lethality events)

+/- RAM - externally applied losses or reinforcements

DGZ - designated aimpoint (lethality events)

TLE - target location error (TLE change event)

VOLLEY ANGLE - volley parameters (lethality event)

VOLLEY LENGTH - volley parameters (lethality event)

JEVNT - a programmer's code number

C. Assets

Since no weapons were included in the REPERTOIRE, there are no weapons listed in the output. In accord with Table 1, the next outputs pertain to assets. Figure 20 lists the names and associated data for all assets listed in the REPERTOIRE. The columns of the asset table give additional (processed) information:

ID - internally assigned asset number

VRS - versatility, jobs this asset can do

```
ENCOUNTER NUMBER   1

FIRST EXAMPLE RUN - DEBUG
*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.

        ((( RANDOM NUMBER SEEDS AT START =        1999.       2999.       3999.       4999.       5999. )))

                  EVENT       OPERANT      WPN TYPE/    NO.RNDS/           DGZ/TLE                VOLLEY    VOLLEY
 EVENT   TIME      TYPE        CHAINS      RECUPTIME     +/- RAM       X           Y          Z     ANGLE     LENGTH        JEVNT
.........................................................................................................................


MISCELLANEOUS VALUES
....................
NO. OF REPLICATIONS =        1
SIGNIFICANCE FOR SUBSTITUTION =  .[illegible]
TIMES FOR INTERNAL RECONSTITUTION EVALUATION =      100.0

>>>>>>>>> INCOMING FIRE DIRECTION ( MEASURED CCW FROM THE TARGET X AXIS ) IS   0.0 DEGREES <<<<<<<<<
>>>>>>>>> DOWN WIND DIRECTION ( MEASURED CCW FROM THE TARGET X AXIS ) IS   0.0 DEGREES <<<<<<<<<
```

Figure 19. Heading, Event Table and Miscellaneous Information from the Output

ID	VRS	IVL	CNTBU	PRSEC-MX/MN	GRNUL	EXPND RT	NO.	NAMES
1	1	-1		1.00/ 1.00	1.00		1.00	TRUCK, TRK
2	1	-1		1.00/ 1.00	1.00		1.00	FKLFT
3	1	-1		1.00/ 1.00	1.00		1.00	CRANE, TRK
4	1	-1		1.00/ 1.00	1.00		1.00	RADIO, TALKY
5	0	-1		1.00/ 1.00	1.00		2.00	ALARM, TALKY
6	1	-1		1.00/ 1.00	1.00		1.00	TELE, TALKY
7	5	0			1.00		1.00	R/T OP, PERSONNEL
8	7	0			1.00		1.00	LOADMSTR, PERSONNEL
9	5	0			1.00		1.00	DRIVER, PERSONNEL
10	5	0			1.00		6.00	MEN, PERSONNEL
11	6	0			1.00		1.00	FKLFT OP, PERSONNEL
12	6	0			1.00		1.00	CRANE OP, PERSONNEL
13	6	0			1.00		1.00	RIGGER, PERSONNEL

Figure 20. Names and Associated Data for all Assets

IVL - a nuclear vulnerability code,
(0 = personnel, - 1 = no data)

CNTBU - chains in which this item can be used in a contaminated state

PRSFC - maximum and minimum persistence factors (pertain to chemical contamination)

GRNUL - granularity, a user option to control assignment step size - (not often used)

EXPND RT - expenditure rate for expendable items

NO. - number of items deployed

Although this run did not involve the employment of any toxic chemical weapons, the individuals were given chemical protective (MOPP) postures (viz the last number on each deployment card - see Appendix A.) Therefore, the degradation by MOPP table is printed.

D. Link Definition Table

Figure 21 contains the parameters used to model the subtasks, as described in Section II. E. The only additional, processed data in the table are:

HOME ID - the internal number of the asset for which the link was named

INLNK - a cross-reference of how many items were deployed to serve in each link, and

MAX IN - the effective number of assigned assets for maximum task effectiveness

MAX EFF - the maximum task effectiveness

MIN IN - the effective number of assigned assets below which task effectiveness is at its minimum

MIN EFF - the minimum task effectiveness

MAX INLNK - The maximum number of individuals (regardless of individual effectiveness) which can be assigned to a task

ASSOCIATED LINK - A different task which influences MAX INLNK for this task

NOT IN LINK - the number of items deployed which have no primary job.

Note that the dummy link is designated as occupied by a negative number of items, in accord with Section II. E.

LNK	NAME	HOME ID	INLNK	MAX IN	MAX EFF(%)	MIN IN	MIN EFF(%)	MAX INLINK	ASSOCIATED LINK
1	HANDLOAD	0	-5.00	5.00	65	1.00	0	UNLMTD	NONE
2	DRIVER	9	1.00	1.00	100	0.00	0	1.00	TRUCK
3	RADIO	4	1.00	1.00	100	0.00	0	UNLMTD	NONE
4	TELE	6	1.00	1.00	100	0.00	0	UNLMTD	NONE
5	TRUCK	1	1.00	1.00	100	0.00	0	UNLMTD	NONE
6	CRANE OP	12	1.00	1.00	100	0.00	0	1.00	CRANE
7	RIGGER	13	1.00	1.00	100	0.00	0	UNLMTD	NONE
8	R/T OP	7	1.00	1.00	100	0.00	0	1.00	NONE
9	FKLFT	2	1.00	1.00	100	0.00	0	UNLMTD	NONE
10	CRANE	3	1.00	1.00	100	0.00	0	UNLMTD	NONE
11	FKLFT OP	11	1.00	1.00	100	0.00	0	1.00	FKLFT
12	LOADMSTR	8	1.00	1.00	100	0.00	75	2.00	NONE
95	NOT IN LINK		8.00						

Figure 21. Subtask Parameters

E. Link - Asset Substitutability Matrix

Figure 22 contains the next output, the link- substitutability matrix. For each functional group, the links in which it can serve are shown. The letter H stands for "home," the primary job of the asset in which it can immediately serve with 1.0 effectiveness. An entry of the form time/effectiveness/order indicates a job into which the asset can substitute in the time and with the effectiveness shown. (The "order" number indicates the order in which the user specified the substitutes and is used to choose one particular substitute over another if all other quantities - versatility, effectiveness, etc. - are equal.) Finally, a blank entry shows that no substitution is possible.

F. Subchains, Orlinks, Compound Links, and Chains

Figure 23 contains a recapitulation of the inputs for subchains, orlinks, compound links, and chains, as described in Sections II. F, G, H, and I.

G. Chain Plots

Figure 24 shows a line-printer depiction of the functional structure (Figure 14). In this figure, different kinds of horizontal lines of characters are used to delineate the various constructs: asterisks (*) for subchains, plus signs (+) for orlinks, and exclamation points (!) for compound links.

H. Deployment and Deployment Plot

Figure 25 contains a recapitulation of the deployment information. (The kill criteria and posture codes will be explained when used in the following sections).

Information listed is:

ID, ASSET - ID number and name of asset or dummy link deployed at this point

LNK - The task being done at this point

XTAR,YTAR - Coordinates of the point

HOWMNY - Number of assets deployed

KCAT - Conventional Kill Criteria Code

NKCAT - Nuclear Kill Criteria Code

TKCAT - Nuclear Posture Code

PSTR - Conventional Posture Code

NUCVR - Nuclear Posture Code

MOPP - MOPP Posture Code

LNKFG

KEY: SUBST. TIME/SUBST. EFFECTIVENESS/SUBST. ORDER-READ-IN

ASSET	1 HANDLOAD	2 DRIVER	3 RADIO	4 TELE	5 TRUCK	6 CRANE OP	7 RIGGER	8 R/T OP	9 FKLFT	10 CRANE	11 FKLFT OP
1 TRUCK	>				H						
2 FKLFT	>								H		
3 CRANE	>									H	
4 RADIO	>		H								
5 ALARM	>										
6 TELE	>			H							
7 R/T OP	> 5/1.0/1	15/.85/1					5/.60/1	H			5/.20/3
8 LOADMSTR	> 5/1.0/1	15/.85/1				5/1.0/3	5/.60/1	20/1.0/1			5/1.0/2
9 DRIVER	> 5/1.0/1	H					5/.60/1	15/.80/2			5/.20/3
10 MEN	> 5/1.0/1	15/.85/1					5/.60/1	15/.80/2			5/.20/3
11 FKLFT OP	> 5/1.0/1	15/.85/1				10/.80/1	5/.60/1	15/.80/2			H
12 CRANE OP	> 5/1.0/1	15/.85/1				H	5/.60/1	15/.80/2			10/.90/1
13 RIGGER	> 5/1.0/1	15/.85/1				5/.50/2	H	15/.80/2			5/.20/3

ASSET	12 LOADMSTR	95 NOLINK
1 TRUCK	>	
2 FKLFT	>	
3 CRANE	>	
4 RADIO	>	
5 ALARM	>	H
6 TELE	>	
7 R/T OP	>	
8 LOADMSTR	> H	
9 DRIVER	>	
10 MEN	>	H
11 FKLFT OP	>	
12 CRANE OP	>	
13 RIGGER	>	

Figure 22. The Link-Asset Substitutability Matrix from the Output

```
LINKS IN EACH SUBCHAIN
**********************

SUBCHAIN  LINKS
---------------

   *1       9     11
   *2      10      6      7


BRANCHES IN EACH ORLINK
++++++++++++++++++++

ORLINK     BRANCHES
---------------

   +1        3        4
   +2      *1         1


COMPOUND (CP) LINKS
***************

CPLINK                .  CP PARTS
.....................:.....................................................
                      .
!LOADING TECHNIQUE    .  +2                    *2
                      .  ( .75)                ( .25)
                      .
                      .


SEGMENTS IN EACH CHAIN
**********************

                            CHAINS
SEG \   1
---------------------------

     .
  1  . R/T OP
  2  . +1
  3  . !LOADING TECHNIQUE
  4  . TRUCK
  5  . LOADMSTR
```

Figure 23. Recapitulation of Subchains, Orlinks, Compound Links and Chain Inputs

```
  *** PLOT OF CHAIN # 1     OPERANT TIMES:(     0.00 -    INF.  )


R/T OP

   !!
   !!
   +++++++++++++
   !!           !!
RADIO        TELE


   !!           !!
   +++++++++++++
   !!
   !!
   !!!!!!!!!!!!!!!!!!!!!!!!!!
   !!                         !!
   .75                        .25
   !!                         !!
   +++++++++++++          ******
   !!           !!          !!
******       HANDLO       CRANE
   !!          AD
FKLFT
                !!          !!
                !!          !!
   !!           !!       CRANE
   !!           !!       OP
FKLFT           !!
OP              !!          !!
                !!          !!
   !!           !!       RIGGER
******          !!
   !!           !!
   +++++++++++++          !!
   !!                     ******
   !!                       !!
   !!!!!!!!!!!!!!!!!!!!!!!!!!
   !!
   !!
TRUCK


   !!
   !!
LOADMS
TR

   !!
   !!
```

Figure 24. Line Printer Depiction of Unit Functional Structure

DEPLOYMENT
****

	ID	ASSETS	LNK	XTAR	YTAR	HOWMNY	KCAT	NKCAT	TKCAT	PSTR	NUCVR	MOPP
1	7	R/T OP	8	0.0	0.0	1.00	1	1	2	1	1	0
2	4	RADIO	3	0.0	0.0	1.00	1	1	1	1	1	0
3	5	ALARM	95	0.0	0.0	1.00	1	1	1	1	1	0
4	6	TELE	4	0.0	0.0	1.00	1	1	1	1	1	0
5	10	MEN	95	0.0	1.0	2.00	1	1	1	1	1	1
6	1	TRUCK	5	20.0	50.0	.60	1	1	1	1	1	0
7	9	DRIVER	2	20.0	50.0	.60	1	1	3	1	1	0
8	2	FKLFT	9	20.0	50.0	1.00	1	1	1	1	1	0
9	11	FKLFT OP	11	20.0	50.0	1.00	1	1	3	1	1	0
10	0	HANDLOAD	1	20.0	50.0	-5.00	1	1	4	1	1	0
11	8	LOADMSTR	12	20.0	80.0	1.00	1	1	5	1	1	0
12	10	MEN	95	20.0	80.0	2.00	1	1	1	1	1	1
13	5	ALARM	95	20.0	80.0	1.00	1	1	1	1	1	0
14	3	CRANE	10	60.0	60.0	1.00	1	1	1	1	1	0
15	12	CRANE OP	6	60.0	60.0	1.00	1	1	3	1	1	0
16	1	TRUCK	5	60.0	60.0	.40	1	1	1	1	1	0
17	9	DRIVER	2	60.0	50.0	.40	1	1	3	1	1	0
18	13	RIGGER	7	60.0	60.0	1.00	1	1	4	1	1	0
19	10	MEN	95	80.0	0.0	2.00	1	1	1	1	1	1

Figure 25. Recapitulation of Deployment Information

Figure 26 is a line printer plot of the deployment. Functional group items are represented by their (2-digit) ID numbers. Co-located elements are depicted side-by-side. The co-location problem, plus the coarse granularity of a line printer, results in these deployment plots being unavoidably distorted. The user is therefore warned to use these plots as quick checks of data, NOT as scaled drawings of the battlefield. (Note: Utility graphics programs do exist to produce scaled drawings of AURA inputs and outputs.)

The deployment plot also shows two directions relative to the deployment coordinates, viz, the incoming fire and downwind directions. (Use of these directions are discussed in subsequent sections.) In these depictions, the incoming fire direction is from the AAs toward the BBs; the wind blows from the YYs to the ZZs.

I. Summary of Output # 1

Printing out of the deployment plot completes the input recapitulation (Section I in Table 1). Since RUN #1 was in the DEBUG ("process input but do not execute") mode, there is no further output. A complete listing of the outputs generated by RUN #1 can be found in Appendix B.

The runstream (Figure 16) had been corrected before being run. For that reason, the only error messages printed were the informative warnings described in Section IV A. There are, however, over 150 different checks that are made on the correctness, completeness, and consistency of the input data. Depending on the severity of the irregularity involved, AURA prints informative, warning, or (fatal) error messages. When possible, processing then continues until all input data has been diagnosed.

V. RUN #2 - EQUIPMENT FAILURE

A. Failure Inputs

In RUN #2, the DEBUG option is removed and the first operational runs are made. In this run, a loss mechanism, viz, mechanical failure of forklift and crane, is also added; and excursions are done to show the sensitivity of results to the failure rates.

The failure of items is initiated by specifying failure rates for them. As shown in Appendix A this is done via the FAILURE RATE option. AURA allows three levels of failure, called light, medium, and dead. These levels allow the modeling of repairs that require different assets and repair times. Since repairs are not introduced in RUN #2, the different levels have no effect in the output. However, levels will be specified in anticipation of RUN #3.

For this run, it is assumed that only forklifts and cranes have significant failure rates, with mean time between failures (MTBF) expressed in minutes:

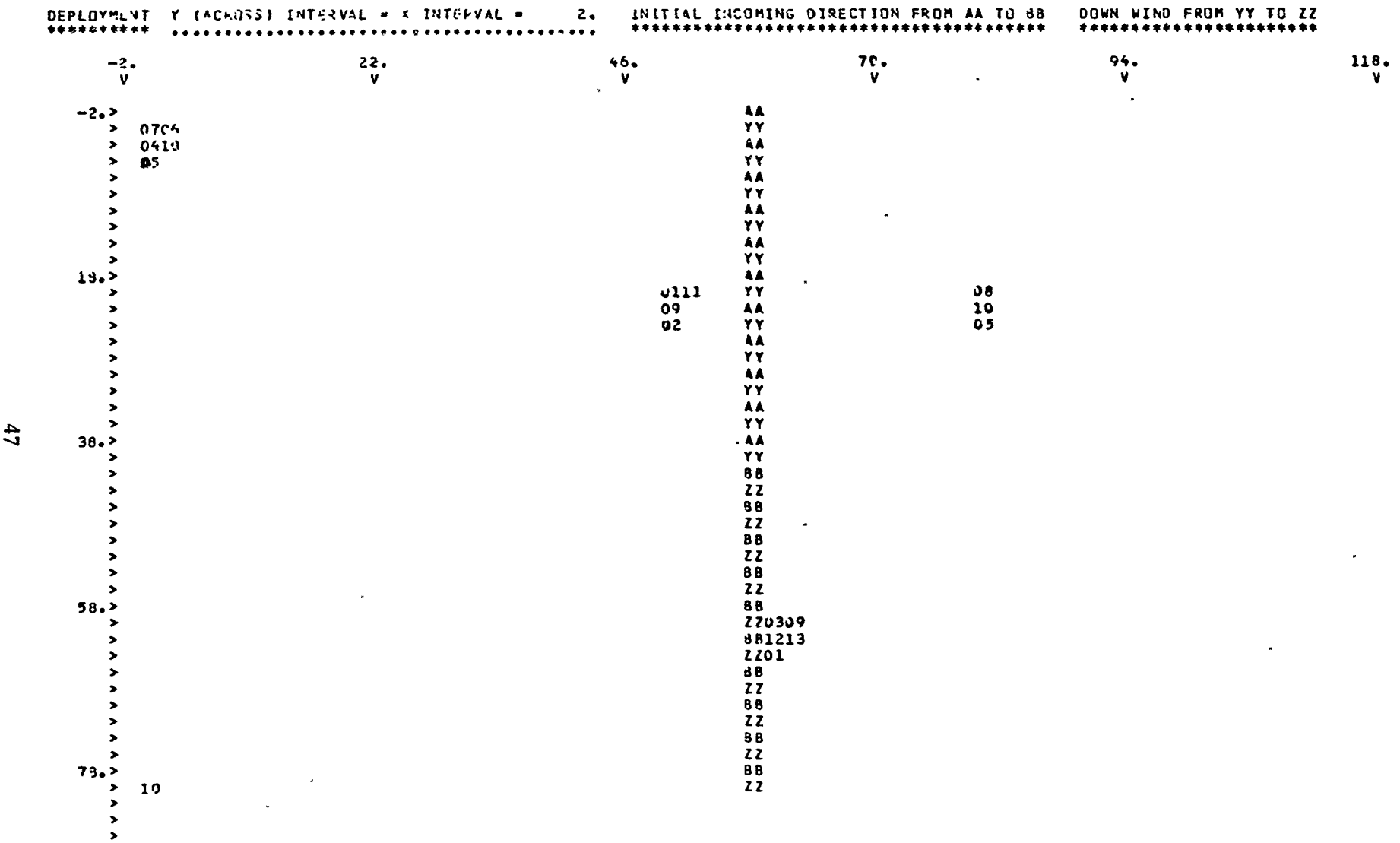

Figure 26. Line Printer Plot of the Deployment

CRANE : MTBF = 1080

FORKLIFT : MTBF = 720

(80% LIGHT, 10% MEDIUM, 10% DEAD.)

B. Reconstitution Events

The AURA effectiveness values describe the ability of the modeled unit to do a mission. It follows, therefore, that to compute effectiveness requires AURA to go through the process of taking an inventory of assets and allocating them to the subtasks. This process, referred to as reconstitution, is performed at specific times, as controlled by the user.

Since a major purpose of AURA is to measure the effects of events upon a unit, the user generally wants reconstitutions and evaluations to take place at specified times relative to certain events, rather than at specific "clock" times within his scenario. (The primary example of such an event is a lethality event, the arrival of a threat warhead.) Thus, rather than asking for effectiveness at 100, 200, and 1000 minutes into the scenario, the user is more concerned with the effectiveness at 100, 200, and 1000 minutes after the arrival of a hostile warhead.

To facilitate specifying relative time points, AURA has the INTERNAL RECONSTITUTION TIMES input (see Appendix A). The INTERNAL card is followed by times; these times are automatically interpreted as time intervals after every lethality event. The AURA preprocessor inserts reconstitution events into the event table (agenda) for the scenario at appropriate intervals after every lethality event. Note, however, that the occurrence of a new lethality event interrupts any time intervals from a preceding event. Thus, if the time intervals were 10 and 100 minutes and lethality events occurred at 50 and 75 (clock) minutes into the scenario, reconstitutions would occur at times 60, 85, and 175: The reconstitution at 150 (100 minutes after the first lethality event) is eliminated by the intervening lethality event at 75.

For this run, time intervals of 10, 60, 120, and 180 minutes were chosen.

Notice, however, that this run did not involve the arrival of hostile warheads. It is therefore necessary to specify the time points, in "clock minutes," from which to measure the time intervals. To do this, AURA provides the user with the RECONSTITUTION option. As shown in Appendix A, the RECONSTITUTION card is followed by (clock) times. AURA treats each time as an event from which to measure time intervals and insert reconstitution events.

For this run, reconstitution points were specified every three hours (0, 180, 360, 540,...). The last point, at 1260, causes the last event to be inserted at clock time 1440, (180 minutes after 1260), resulting in a total scenario of 24 hours.

C. Replications

The failure of items in AURA is modeled using a Monte Carlo technique: random numbers are drawn against (exponentially distributed) failure probabilities. It is necessary, therefore, to run a number of interactions in order to draw a sufficient number of random numbers to accurately reflect the failure distribution. This need for replications applies to all AURA runs involving Monte Carlo modeled phenomena, especially those involving the arrival of threat warheads. The number of replications needed to confidently probe a distribution is a subject of considerable study and will not be discussed here. However, the user will note that the standard deviation and frequency distribution of results, two quantities of use in establishing the confidence level of the mean results, are standard AURA outputs.

For this run, 50 replications will be made.

D. Runstream for RUN #2

The total runstream for RUN #2 is shown in Figure 27. The dashed line delineates data added for this run. In addition, note that the MODE-DEBUG command was removed.

E. Output from RUN #2

E.1. Output from RUN #2. The output for RUN #2 is shown in Appendix C. The first eight pages, which contain the repeat of the inputs (Section I in Table 1), is very similar to the output from RUN #1 (Appendix B). The two additions to the RUN #1 output are the expanded event table and the reliability-type failure data, shown in Figure 28.

The event table is read as follows: the first two columns give the event number and time; the next column gives the event type. Here, "INITIAL" is a reconstitution event inserted by AURA to establish the initial condition (allocations, deployments, etc.) for the unit. "USER RCNST" is a (clock) time point specified by the input, from which to measure internal reconstitution time intervals. Three "RCNSTITUTE" events follow, spaced at 10, 60, and 120 minutes; these events were inserted by AURA, as discussed in Section V. B. It is at these RCNSTITUTE events that AURA will optimize the allocation of surviving assets and evaluate the unit effectiveness.

Following the event column, the event table gives specific data pertaining to each event. The columns, therefore, may contain different parameters, depending on the event type. For this run, only two data are given "OPERANT CHAINS" indicating the chains (combinations of tasks) which are available to the commander for performance of the mission: here, only one chain (#1) is available. The next column gives the amount of time since the most recent attack, which is a measure of time to reconstitute. Here, since no attacks have been specified, the RECUPTIME equals the clock time.

(Three other columns, marked "JEVNT," are included on the output. These contain internally generated pointers to data of interest to AURA programmers only.)

```
#THIS IS THE INPUT FOR RUN #2
REPERTOIRE
FGS
TRUCK,TRK
FKLFT
CRANE,TRK
RADIO,TALKY
ALARM,TALKY
TELE,TALKY
R/T OP, PERSONNEL
LOADMSTR, PERSONNEL
DRIVER, PERSONNEL
MEN, PERSONNEL
FKLFT OP, PERSONNEL
CRANE OP, PERSONNEL
RIGGER, PERSONNEL
# ANY RUN WHICH EMPLOYS WEAPONS ( REF. OTHER EXAMPLES IN THIS REPORT )
# MUST LIST WEAPON NAMES AFTER A "WEAPON" CARD IN THE REPERTOIRE
END  # THIS END CARD IS ESSENTIAL
# NOTE THE USE OF THE # SIGN TO INPUT COMMENTS TRANSPARENT TO THE CODE
DEPLOYMENT
R/T OP, 0.,0., 1.,1,1,2,1,1,0
RADIO, 0.,0.,1.,1,1,1,1,1,)
ALARM, 0.,0.,1.,1,1,1,1,1,0
TELE, 0.,0.,1.,1,1,1,1,1,0
MEN, 0.,1.,2.,1,1,1,1,1,1
TRUCK, 20.,50.,0.6,1,1,1,1,1,0
DRIVER,20.,50.,0.6,1,1,3,1,1,0
FKLFT, 20.,50.,1.,1,1,1,1,1,0
FKLFT OP, 20.,50.,1.,1,1,3,1,1,0
HANDLOAD,20.,50.,-5.,1,1,4,1,1,0  # THIS IS A DUMMY LINK.
# THE - SIGN ABOVE IS OPTIONAL. SINCE HANDLOAD ISN'T IN THE REPERTOIRE,
# THE CODE KNOWS HANDLOAD IS A DUMMY LINK.
LOADMSTR,20.,80.,1.,1,1,5,1,1,0
MEN,20.,40.,2.,1,1,1,1,1,1
ALARM, 20.,80.,1.,1,1,1,1,1,0
CRANE,60.,60.,1.,1,1,1,1,1,0
CRANE OP,60.,60.,1.,1,1,3,1,1,0
TRUCK,60.,60.,0.4,1,1,1,1,1,0
DRIVER,60.,60.,0.4,1,1,3,1,1,0
RIGGER,60.,60.,1.,1,1,4,1,1,0
MEN,80.,0.,2.,1,1,1,1,1,1
END
LINKS
DRIVER, 1., 1.
$A, TRUCK
$PERSONNEL
$T,15.
$P,.85
RADIO,1.0
TELE,1.0
```

Figure 27. RUNSTREAM for RUN #2

```
TRUCK,1.0
CRANE OP,1.0,1.0
$A,CRANE
$FKLFT OP, RIGGER, LOADMSTR
$T, 10., 5., 5.
$E, 0.8, 0.5, 1.0
RIGGER, 1.0
$PERSONNEL
$T, 5.
$E, 0.6
R/T OP, 1.0, 1.0
$LOADMSTR,PERSONNEL
$T,20.,15.
$E, 1.0, 0.8
FKLFT, 1.0
CRANE, 1.0
FKLFT OP, 1.0, 1.0
$A, FKLFT
$CRANE OP, LOADMSTR, PERSONNEL
$E,0.9, 1.0, 0.2
$T, 10., 5., 5.
LOADMSTR, 1., 2.
$M,75
HANDLOAD, 5.0, 65
$M,1.0
$PERSONNEL
$E,1.
$T,5.
END
SUBCHAINS
*1, FKLFT, FKLFT OP
*2, CRANE, CRANE OP, RIGGER
END
ORLINK
+1, RADIO, TELE
+2, *1, HANDLOAD
END
COMPOUND LINK
!LOADING TECHNIQUE
+2, 0.75
*2, 0.25
END
CHAINS
R/T OP, +1, !LOADING TECHNIQUE, TRUCK, LOADMSTR
END
HEADING
SECOND EXAMPLE RUN - FAILURES
END
FAILURE RATE
CRANE, 1080.,.8,.1
FKLFT, 720., .8,.1
END
```

Figure 27. RUNSTREAM for RUN #2 (con't)

```
INTERNAL RECONSTITUTION TIMES
#THESE ARE THE TIME INTERVALS FOR RECONST., RELATIVE TO OTHER EVENTS
10.,60.,120.,180.
END
RECONSTITUTIONS
#THIS INSERTS DUMMY EVENTS TO ALLOW FIXING THE ABOVE INTERVALS
0.,180.,360.,540.,720.,900.,1030.,1260.
#NOTE THAT THESE ARE ABSOLUTE SCENARIO "CLOCK" TIMES, AS OPPOSED TO THE
#RELATIVE TIMES SPECIFIED AFTER THE INTERNAL CARD
END
REPLICATIONS
50
END
GO
STOP
```

Figure 27. RUNSTREAM for RUN #2 (con't)

EVENT	TIME	EVENT TYPE	OPERANT CHAINS	WPN TYPE/ RECUPTIME	NO.RNDS/ +/- RAN	DGZ/TLE X	Y	Z	VOLLEY ANGLE	VOLLEY LENGTH	JEVNT		
1	0.00	INITIAL	1								0	0	0
2	0.00	USER RCNST	1								999	0	0
3	10.00	RCNSTITUTE	1	10.00							0	0	1
4	60.00	RCNSTITUTE	1	60.00							0	0	2
5	120.00	RCNSTITUTE	1	120.00							0	0	3
6	180.00	USER RCNST	1								999	0	0
7	190.00	RCNSTITUTE	1	190.00							0	0	1
8	240.00	RCNSTITUTE	1	240.00							0	0	2
9	300.00	RCNSTITUTE	1	300.00							0	0	3
10	360.00	USER RCNST	1								999	0	0
11	370.00	RCNSTITUTE	1	370.00							0	0	1
12	420.00	RCNSTITUTE	1	420.00							0	0	2
13	480.00	RCNSTITUTE	1	480.00							0	0	3
14	540.00	USER RCNST	1								999	0	0
15	550.00	RCNSTITUTE	1	550.00							0	0	1
16	600.00	RCNSTITUTE	1	600.00							0	0	2
17	660.00	RCNSTITUTE	1	660.00							0	0	3
18	720.00	USER RCNST	1								999	0	0
19	730.00	RCNSTITUTE	1	730.00							0	0	1
20	780.00	RCNSTITUTE	1	780.00							0	0	2
21	840.00	RCNSTITUTE	1	840.00							0	0	3
22	900.00	USER RCNST	1								999	0	0
23	910.00	RCNSTITUTE	1	910.00							0	0	1
24	960.00	RCNSTITUTE	1	960.00							0	0	2
25	1020.00	RCNSTITUTE	1	1020.00							0	0	3
26	1080.00	USER RCNST	1								999	0	0
27	1090.00	RCNSTITUTE	1	1090.00							0	0	1
28	1140.00	RCNSTITUTE	1	1140.00							0	0	2
29	1200.00	RCNSTITUTE	1	1200.00							0	0	3
30	1260.00	USER RCNST	1								999	0	0
31	1270.00	RCNSTITUTE	1	1270.00							0	0	1
32	1320.00	RCNSTITUTE	1	1320.00							0	0	2
33	1380.00	RCNSTITUTE	1	1380.00							0	0	3
34	1440.00	RCNSTITUTE	1	1440.00							0	0	4

RELIABILITY-TYPE FAILURES

FG		MTBTF	LITE	MED.
2	FKLFT	720.000	.800	.100
3	CRANE	1080.000	.800	.100

Figure 28. The Expanded Event Table and Reliability-Type Failure Data for RUN #2

E.2. Results. After printing the consolidation of inputs, AURA begins replications through the event simulations. As listed in Table 1, many intermediate results are available at this point. However, in RUN #2, no intermediate outputs were turned on. Therefore, following the consolidation of inputs, the RUN #2 output begins a report of results.

First, to assure attention to warnings that were generated in the run, the results section is headed by a repeat of all warnings. Next follows a major output, the effectiveness vs. time, as shown in Figure 29. The left-most column gives the (clock) time points, which corresponds to the RCNSTITUTE points in the event table. At each time point, the effectiveness - averaged over 50 replications - and the standard deviation in the average are given. One notes that the effectiveness begins at 1.0 and steadily decreases, ending at 0.63 by time 1440. These monotonically decreasing results, which are plotted in Figure 30, reflect the kind of behavior to be expected in a system with failures but no repair.

As shown in Figure 29, the effectiveness versus time output also includes the distribution of results at each time. This output records the number of interactions resulting in effectiveness values falling within the listed ranges. Thus, the distribution output shows whether the average effectiveness resulted from a spread of results, a single cluster of results, or multiple clusters. In the present case, it appears that the results indeed cluster about the average. One notes, however, that no results fall below 0.40. As will be apparent below, this results from the availability of the HANDLOAD alternative to provide some loading capability even when both FKLFT and CRANE have failed.

The next output, shown in Figure 31, is the asset survivor table, averaged over the 50 replications. As expected, the average number of FKLFTs and CRANEs decreases, with a faster decrease in FKLFT reflecting its shorter mean time between failures (MTBF).

The next output is the link summary table. This table reports, where applicable, six results for each link for each reconstitution time:

1. Number of replications in which the link was used.

2. Number of replications in which the link was weak due to lack of assets.

3. Number of replications in which the link was weak due to limited number allowed in link.

4. Number of replications in which the link was 0 in a compound link, and thus not used at all.

*** EFFECTIVENESS VS. TIME ***

TIME	EFFECTIVENESS	FREQUENCY DISTRIBUTION OF RESULTS										
		100	90-99	80-89	70-79	60-69	50-59	40-49	30-39	20-29	10-19	1-9	0
0.00	1.00 +/- .000	50	0	0	0	0	0	0	0	0	0	0	0
10.00	1.00 +/- .005	49	0	0	1	0	0	0	0	0	0	0	0
60.00	.98 +/- .009	47	0	0	3	0	0	0	0	0	0	0	0
120.00	.96 +/- .015	44	0	0	5	0	0	1	0	0	0	0	0
180.00	.93 +/- .018	37	0	0	12	0	0	1	0	0	0	0	0
240.00	.90 +/- .019	32	0	0	17	0	0	1	0	0	0	0	0
300.00	.89 +/- .021	31	0	0	17	0	0	2	0	0	0	0	0
370.00	.85 +/- .024	26	0	0	19	0	0	5	0	0	0	0	0
420.00	.85 +/- .024	25	0	0	20	0	0	5	0	0	0	0	0
480.00	.84 +/- .024	23	0	0	22	0	0	5	0	0	0	0	0
550.00	.82 +/- .025	21	0	0	23	0	0	6	0	0	0	0	0
600.00	.81 +/- .024	19	0	0	25	0	0	6	0	0	0	0	0
660.00	.79 +/- .025	18	0	0	24	0	0	8	0	0	0	0	0
730.00	.77 +/- .025	15	0	0	26	0	0	9	0	0	0	0	0
780.00	.76 +/- .026	14	0	0	25	0	0	11	0	0	0	0	0
840.00	.75 +/- .025	12	0	0	27	0	0	11	0	0	0	0	0
910.00	.72 +/- .023	8	0	0	30	0	0	12	0	0	0	0	0
960.00	.71 +/- .023	7	0	0	30	0	0	13	0	0	0	0	0
1020.00	.71 +/- .023	7	0	0	30	0	0	13	0	0	0	0	0
1090.00	.71 +/- .023	7	0	0	29	0	0	14	0	0	0	0	0
1140.00	.70 +/- .024	7	0	0	28	0	0	15	0	0	0	0	0
1200.00	.70 +/- .024	7	0	0	28	0	0	15	0	0	0	0	0
1270.00	.70 +/- .024	7	0	0	27	0	0	16	0	0	0	0	0
1320.00	.69 +/- .023	6	0	0	27	0	0	17	0	0	0	0	0
1380.00	.67 +/- .023	5	0	0	26	0	0	19	0	0	0	0	0
1440.00	.67 +/- .022	4	0	0	27	0	0	19	0	0	0	0	0

Figure 29. Effectiveness vs. Time Data for RUN #2

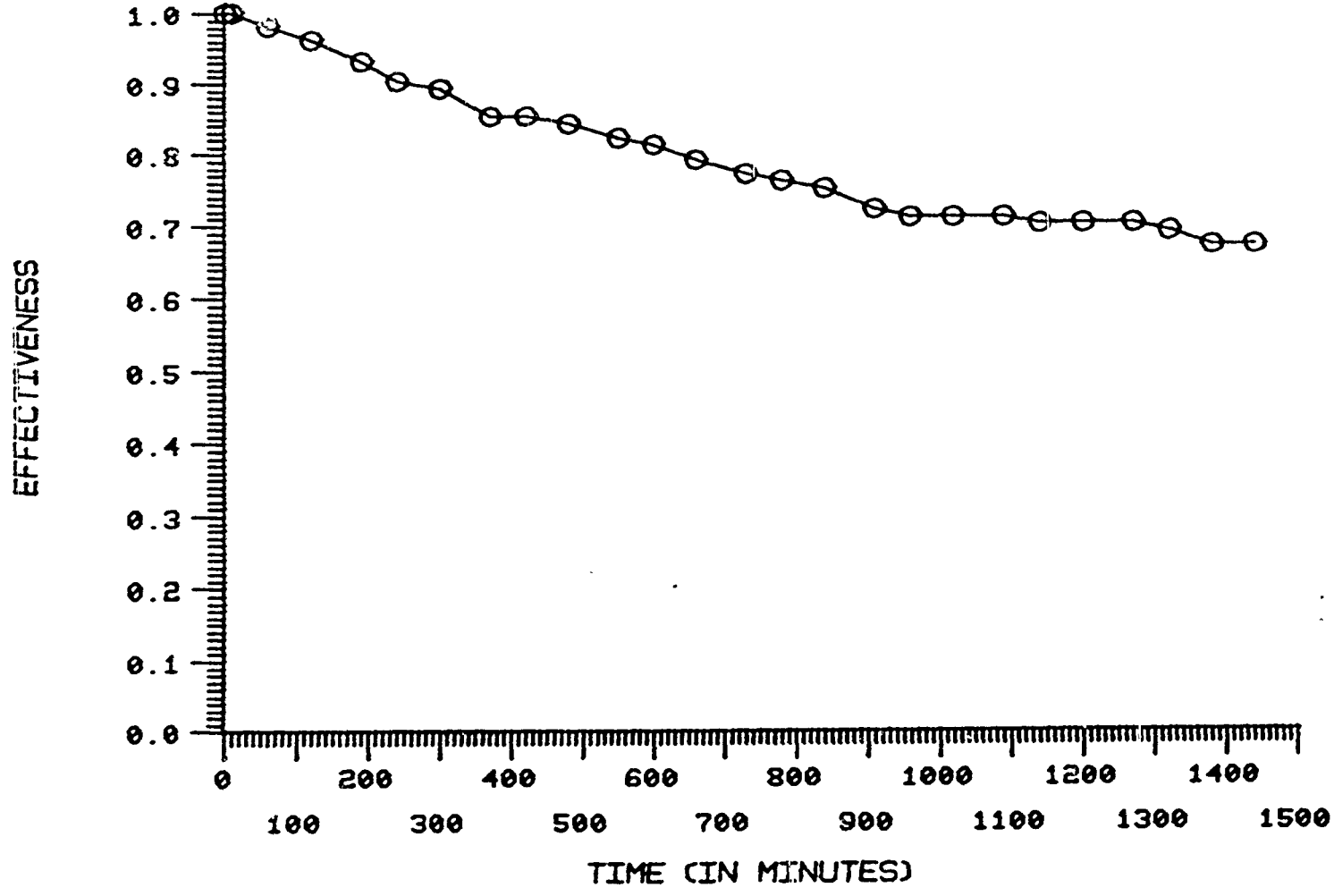

Figure 30. Plot of Effectiveness vs Time Data for RUN #2

FUNCTIONAL GROUP SURVIVORS - INCLUDING CONTAMINATED - VS. TIME FOR REPLICATION 0

TIME	1 TRUCK	2 FKLFT	3 CRANE	4 RADIO	5 ALARM	6 TELE	7 R/T OP	8 LOADMSTR	9 DRIVER	10 MEN	11 FKLFT OP	12 CRANE OP	13 RIGGER
0.00	1.00	1.00	1.00	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
10.00	1.00	1.00	.98	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
60.00	1.00	.98	.96	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
120.00	1.00	.90	.96	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
190.00	1.00	.82	.90	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
240.00	1.00	.76	.86	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
300.00	1.00	.72	.86	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
370.00	1.00	.64	.78	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
420.00	1.00	.64	.76	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
480.00	1.00	.62	.74	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
550.00	1.00	.60	.70	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
600.00	1.00	.58	.68	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
660.00	1.00	.54	.66	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
730.00	1.00	.50	.62	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
780.00	1.00	.44	.62	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
840.00	1.00	.42	.60	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
910.00	1.00	.34	.58	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
960.00	1.00	.30	.58	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
1020.00	1.00	.30	.58	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
1090.00	1.00	.30	.56	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
1140.00	1.00	.28	.56	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
1200.00	1.00	.28	.56	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
1270.00	1.00	.26	.56	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
1320.00	1.00	.24	.54	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
1380.00	1.00	.22	.50	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
1440.00	1.00	.22	.48	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00

Figure 31. Functional Group Survivor Table for RUN #2

5. Number of replications in which the link was used in an "as available" (non-optimized) application.

6. Number of replications in which the link was weak when used "as available."

Figure 32 contains the link summary table for RUN #2. As an example, refer to the six lines for time 370. Reading across the first (number of uses) line, one sees that four links (RADIO, TRUCK, R/T OP, and LOADMSTR) were used in all 50 replications. This is consistent with the number of non-zero replications reported in the results distribution table (Figure 29), and the observation that the structure of the job (chain) requires these jobs in every non-zero replication. The crane team members (CRANE, CRANE OP, and RIGGER) had only 39 uses: thus, in 11 replications, the unit was unable to load heavy items at time 370. The forklift team (FKLFT and FKLFT OP) had only 32 uses. Some light loading capability was still available, however, via the HANDLOAD link; and one sees that HANDLOAD was used in 18 replications.

Scanning line 2, the "weakest link because of assets" line, it is seen that the HANDLOAD link was the weakest link in every chain in which it was used.

Since RUN #2 involves no limitations on number of substitutes, and no "as available" activities, lines #3, 5, and 6 can have no non-zero entries. In line #4, "number of times = 0 in a compound link" has an entry (10) for the CRANE. This indicates that, in the 10 replications in which the crane team did not function, the CRANE job is the one which could not be accomplished.

The final outputs from RUN #2 are the chain results and end-of-encounter summaries. Since only one chain was used in every replication, the chain results merely repeat the encounter results (Figure 29). The end-of-encounter results, Figure 33, gives the average numbers of light, medium, and dead failures, and the average equipment status at the end of the encounter.

The complete output from RUN #2 is contained in Appendix C.

VI. RUN #3 - REPAIR

A. Repair Inputs

In this run, repair activity is added. In AURA (as in an actual unit), repair requires the commitment of resources for various amounts of time. The input (see Appendix A) therefore calls for the specification of tasks which must be done to effect the repair, as well as the times that are required.

For this run, assume that light damage can be repaired in an average of 120 minutes with a standard deviation of +/-50 minutes, while the corresponding times for medium damage are 360 +/-100 minutes. Furthermore, assume that only the two operators and the loadmaster are capable of performing the repair task, that two people are required for 100

LINK RESULTS VS. TIME FOR REPLICATION 0

KEY: LINE1 = # OF ACTUAL USES (INCL. = (IF NOT IN CPLNK)
LINE2 = # OF TIMES WEAK BECAUSE ASSETS UNAVAILABLE
LINE3 = # OF TIMES WEAK, LIMITED BY NO. ALLOWED IN LINK
LINE4 = # OF TIMES = 0 IN COMPOUND LNK (THUS NOT COUNTED IN LINE1)
LINE5 = # OF AS-AVAILABLE USES (AS IN REPAIR)
LINE6 = NO. TIMES LIMITING IN AS-AVAILABLE USES

TIME	HANDLOAD 1	DRIVER 2	RADIO 3	TELE 4	TRUCK 5	CRANE OP 6	RIGGER 7	R/T OP 8	FKLFT 9	CRANE 10	FKLFT OP 11	LOADMSTR 12
0.00	0	0	50	0	50	50	50	50	50	50	50	50
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
10.00	0	0	50	0	50	49	49	50	50	49	50	50
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	1<<	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
60.00	1	0	50	0	50	48	48	50	49	48	49	50
	1<<	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	2<<	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0

Figure 32. LINK Summary Table for RUN #2

120.00	5	0	50	0	50	48	48	50	45	48	45	50
	5<<	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	2<<	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
190.00	9	0	50	0	50	45	45	50	41	45	41	50
	9<<	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	5<<	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
240.00	12	0	50	0	50	43	43	50	38	43	38	50
	12<<	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	7<<	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
300.00	14	0	50	0	50	43	43	50	36	43	36	50
	14<<	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	7<<	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
370.00	18	0	50	0	50	39	39	50	32	39	32	50
	18<<	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	11<<	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
420.00	18	0	50	0	50	38	38	50	32	38	32	50
	18<<	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	12<<	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
480.00	19	0	50	0	50	37	37	50	31	37	31	50
	19<<	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	13<<	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
550.00	20	0	50	0	50	35	35	50	30	35	30	50
	20<<	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	15<<	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
600.00	21	0	50	0	50	34	34	50	29	34	29	50
	21<<	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	16<<	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
660.00	23	0	50	0	50	33	33	50	27	33	27	50

Figure 32. LINK Summary Table for RUN #2 (con't)

	.	23<<	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	17<<	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
730.00	.	25	0	50	0	50	31	31	50	23	31	25	50
	.	25<<	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	19<<	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
780.00	.	28	0	50	0	50	31	31	50	22	31	22	50
	.	28<<	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	19<<	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
840.00	.	29	0	50	0	50	30	30	50	21	30	21	50
	.	29<<	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	20<<	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
910.00	.	33	0	50	0	50	29	29	50	17	29	17	50
	.	33<<	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	21<<	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
960.00	.	35	0	50	0	50	29	29	50	15	29	15	50
	.	35<<	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	21<<	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
1020.00	.	35	0	50	0	50	29	29	50	15	29	15	50
	.	35<<	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	21<<	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
1090.00	.	35	0	50	0	50	28	28	50	15	28	15	50
	.	35<<	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	22<<	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
1140.00	.	36	0	50	0	50	28	28	50	14	28	14	50
	.	36<<	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	22<<	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
1200.00	.	36	0	50	0	50	28	28	50	14	28	14	50
	.	36<<	0	0	0	0	0	0	0	0	0	0	0

Figure 32. LINK Summary Table for RUN #2 (con't)

	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	22<<	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
1270.00	.	37	0	50	0	50	28	28	50	13	28	13	50
	.	37<<	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	22<<	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
1320.00	.	38	0	50	0	50	27	27	50	12	27	12	50
	.	38<<	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	23<<	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
1380.00	.	39	0	50	0	50	25	25	50	11	25	11	50
	.	39<<	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	25<<	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
1440.00	.	39	0	50	0	50	24	24	50	11	24	11	50
	.	39<<	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	26<<	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0

Figure 32. LINK Summary Table for RUN #2 (con't)

END-OF-ENCOUNTER SUMMARY
****

	ASSET	INITIAL	UNHARMED	CONTAMD	LIT DAM	MED DAM
1	TRUCK	1.00	1.00	0.00	0.00	0.00
2	FKLFT	1.00	.22	0.00	.56	.08
3	CRANE	1.00	.48	0.00	.40	.08
4	RADIO	1.00	1.00	0.00	0.00	0.00
5	ALARM	2.00	2.00	0.00	0.00	0.00
6	TELE	1.00	1.00	0.00	0.00	0.00

Figure 33. End-of-Encounter Summary Data for Equipment

percent effectiveness; and the repairs are done at location 10., 10. (near the radio operator).

Repairs can also require spare parts, which are expended by the repair process. Deployment of parts and definition of the task (LINK) that parts fill is done no differently than for any other material. However, use of the EXPENDABLE option (see Appendix A) causes parts to be used up proportionally to the repairs that are completed.

For this run, assume that the parts required for repairing light damage are called PARTS, that they are stocked and used in discrete sets, one per repair, and that they are deployed at the 10., 10. repair location.

B. Output Controls

It will be illustrative, on this run, to look in detail at some of the intermediate occurrences. For example, if the unit is limited by a repairable item, the decision may be made to allocate assets to the repair task. Thus, it might be of interest to have failures, repair activity, and asset allocation reported. AURA allows the user to specify which of several kinds of intermediate results are output. These options are listed in Appendix A under the control mnemonic OUTPUT.

C. Runstream for RUN #3

The data lines which were added to the RUN #2 runstream to produce RUN #3 are indicated by arrows in Figure 34.

VII. OUTPUT FROM RUN #3

A. Baseline Output

Figure 35 contains the effectiveness versus time data from RUN #3. Unlike RUN #2, which had no repairs, the average ability of the unit to load trucks does not continue to decrease toward 0.40 (the handload-only asymptote); rather, a "plateau" is reached around 0.85 at which the failures and repairs seem to be "balanced." In fact, a slow decrease is still present, since dead (irreparable) failures continue to constitute 10 percent of all failures.

Inspection of the survivor table (Figure 36) shows the effects of repair: a much less precipitous decrease in the number of forklifts and cranes, and a slow decrease in the average number of PARTS.

The link results table (Figure 37) shows the effects of repair activity. Beginning at time 10., requests for the repair link began, and by time 60., had begun to be undertaken. The HANDLOAD link was often still a limitation, since loading continued while repair was being conducted. Several new phenomena appear. The LOADMSTR and FKLFT OP jobs became limitations in some replications, since the needed personnel are engaged in repair. Repairs are seen to be done both as part of the

```
#THIS IS THE INPUT FOR RUN #3
REPERTOIRE
FGS
TRUCK,TRK
FKLFT
CRANE,TRK
RADIO,TALKY
ALARM,TALKY
TELE,TALKY
R/T OP, PERSONNEL
LOADMSTR, PERSONNEL
DRIVER, PERSONNEL
MEN, PERSONNEL
FKLFT OP, PERSONNEL
CRANE OP, PERSONNEL
RIGGER, PERSONNEL
PARTS
# ANY RUN WHICH EMPLOYS WEAPONS ( REF. OTHER EXAMPLES IN THIS REPORT )
# MUST LIST WEAPON NAMES AFTER A "WEAPON" CARD IN THE REPERTOIRE
END  # THIS END CARD IS ESSENTIAL
# NOTE THE USE OF THE # SIGN TO INPUT COMMENTS TRANSPARENT TO THE CODE
DEPLOYMENT
R/T OP, 0.,0., 1.,1,1,2,1,1,0
RADIO, 0.,0.,1.,1,1,1,1,1,0
ALARM, 0.,0.,1.,1,1,1,1,1,0
TELE, 0.,0.,1.,1,1,1,1,1,0
MEN, 0.,1.,2.,1,1,1,1,1,1
TRUCK, 20.,50.,0.6,1,1,1,1,1,0
DRIVER,20.,50.,0.6,1,1,3,1,1,0
FKLFT, 20.,50.,1.,1,1,1,1,1,0
FKLFT OP, 20.,50.,1.,1,1,3,1,1,0
HANDLOAD,20.,50.,-5.,1,1,4,1,1,0  # THIS IS A DUMMY LINK.
# THE - SIGN ABOVE IS OPTIONAL. SINCE HANDLOAD ISN'T IN THE REPERTOIRE,
# THE CODE KNOWS HANDLOAD IS A DUMMY LINK.
LOADMSTR,20.,30.,1.,1,1,5,1,1,0
MEN,20.,80.,2.,1,1,1,1,1,1
ALARM, 20.,80.,1.,1,1,1,1,1,0
CRANE,60.,60.,1.,1,1,1,1,1,0
CRANE OP,60.,60.,1.,1,1,3,1,1,0
TRUCK,60.,60.,0.4,1,1,1,1,1,0
DRIVER,60.,60.,0.4,1,1,3,1,1,0
RIGGER,60.,60.,1.,1,1,4,1,1,0
MEN,80.,0.,2.,1,1,1,1,1,1
PARTS,10.,10.,100.,1,1,1,1,1,0
REPAIR,10.,10.,-2.,1,1,1,1,1,0
END
LINKS
DRIVER, 1., 1.
$A, TRUCK
$PERSONNEL
$T,15.
$E,.85
```

Figure 34. RUNSTREAM for RUN #3

```
RADIO,1.0
TELE,1.0
TRUCK,1.0
CRANE OP,1.0,1.0
$A,CRANE
$FKLFT OP, RIGGER, LOADMSTR
$T, 10., 5., 5.
$E, 0.8, 0.5, 1.0
RIGGER, 1.0
$PERSONNEL
$T, 5.
$E, 0.6
CHAINS
R/T OP, +1, !LOADING TECHNIQUE, TRUCK, LOADMSTR
END
HEADING
THIRD EXAMPLE RUN - REPAIRS
END
FAILURE RATE
CRANE, 1080.,.8,.1
FKLFT, 720., .8,.1
END
INTERNAL RECONSTITUTION TIMES
#THESE ARE THE TIME INTERVALS FOR RECONST., RELATIVE TO OTHER EVENTS
10.,60.,120.,180.
END
RECONSTITUTIONS
#THIS INSERTS DUMMY EVENTS TO ALLOW FIXING THE ABOVE INTERVALS
0.,180.,360.,540.,720.,900.,1080.,1260.
#NOTE THAT THESE ARE ABSOLUTE SCENARIO "CLOCK" TIMES, AS OPPOSED TO THE
#RELATIVE TIMES SPECIFIED AFTER THE INTERNAL CARD
END
REPLICATIONS
50
END
EXPENDABLE
$PARTS  # THE $ INDICATES EXPENDITURE CONNECTED TO REPAIR
END
R/T OP, 1.0, 1.0
$LOADMSTR,PERSONNEL
$T,20.,15.
$E, 1.0, 0.8
FKLFT, 1.0
CRANE, 1.0
FKLFT OP, 1.0, 1.0
$A, FKLFT
$CRANE OP, LOADMSTR, PERSONNEL
$E,0.9, 1.0, 0.2
$T, 10., 5., 5.
LOADMSTR, 1., 2.
$M,75
```

Figure 34. RUNSTREAM for RUN #3 (con't)

```
HANDLOAD, 5.0, 65
$M,1.0
$PERSONNEL
$E,1.
$T,5.
PARTS,1.0                                    <--
REPAIR,2.0                                   <--
$LOADMSTR,CRANE OP,FKLFT OP
$T,15.,15.,10.
$E,1.,1.,1.
END
SUBCHAINS
*1, FKLFT, FKLFT OP
*2, CRANE, CRANE OP, RIGGER
*3,REPAIR,PARTS                              <--
END
ORLINK
+1, RADIO, TELE
+2, *1, HANDLOAD
END
COMPOUND LINK
!LOADING TECHNIQUE
+2, 0.75
*2, 0.25
END
REPAIR                                       <--
FKLFT
$ *3,1,1.0,120.,50.,10.,10. # RPR LNK,DMG LVL,PRTY,RPR TIM,STD.DEV.,LOC
$ *3,2,1.0,360.,100.,10.,10.
CRANE
$ *3,1,1.0,120.,50.,10.,10.
$ *3,2,1.0,360.,100.,10.,10.
END
OUTPUT
CASUALTIES,ON
END
GO
STOP
```

Figure 34. RUNSTREAM for RUN #3 (con't)

*** EFFECTIVENESS VS. TIME ***

TIME	EFFECTIVENESS	OPR CHNS	100	90-99	80-89	70-79	60-69	50-59	40-49	30-39	20-29	10-19	1-9	0
0.00	1.00 +/- .000	1	50	0	0	0	0	0	0	0	0	0	0	0
10.00	1.00 +/- .000	1	50	0	0	0	0	0	0	0	0	0	0	0
60.00	1.00 +/- .005	1	49	0	0	1	0	0	0	0	0	0	0	0
120.00	.96 +/- .014	1	42	0	0	8	0	0	0	0	0	0	0	0
190.00	.93 +/- .017	1	36	0	0	14	0	0	0	0	0	0	0	0
240.00	.91 +/- .020	1	35	0	0	13	0	1	1	0	0	0	0	0
300.00	.89 +/- .022	1	32	0	0	14	0	3	1	0	0	0	0	0
370.00	.92 +/- .019	1	37	0	0	11	1	1	0	0	0	0	0	0
420.00	.92 +/- .017	1	35	0	0	14	1	0	0	0	0	0	0	0
480.00	.92 +/- .018	1	35	0	0	13	2	0	0	0	0	0	0	0
550.00	.91 +/- .020	1	34	0	0	12	4	0	0	0	0	0	0	0
600.00	.91 +/- .018	1	32	0	0	18	0	0	0	0	0	0	0	0
660.00	.88 +/- .020	1	28	0	0	20	1	0	1	0	0	0	0	0
730.00	.88 +/- .020	1	29	0	0	18	2	0	1	0	0	0	0	0
780.00	.88 +/- .020	1	29	0	0	19	1	0	1	0	0	0	0	0
840.00	.88 +/- .020	1	28	0	0	20	1	0	1	0	0	0	0	0
910.00	.87 +/- .019	1	25	0	0	23	2	0	0	0	0	0	0	0
960.00	.85 +/- .021	1	24	0	0	23	1	1	1	0	0	0	0	0
1020.00	.84 +/- .022	1	22	0	0	23	2	2	1	0	0	0	0	0
1090.00	.83 +/- .022	1	21	0	0	25	1	1	2	0	0	0	0	0
1140.00	.84 +/- .021	1	22	0	0	24	2	1	1	0	0	0	0	0
1200.00	.84 +/- .023	1	22	1	0	20	4	0	3	0	0	0	0	0
1270.00	.83 +/- .023	1	21	1	0	20	4	1	3	0	0	0	0	0
1320.00	.84 +/- .023	1	22	1	0	21	2	2	2	0	0	0	0	0
1380.00	.84 +/- .022	1	22	1	0	21	2	3	1	0	0	0	0	0
1440.00	.85 +/- .021	1	22	1	1	21	4	1	0	0	0	0	0	0

Figure 35. Effectiveness vs Time Data for RUN #3

ASSE. SURVIVORS - INCLUDING CONTAMINATED - VS. TIME FOR REPLICATION 0

TIME	1 TRUCK	2 FKLFT	3 CRANE	4 RADIO	5 ALARM	6 TELE	7 R/T OP	8 LOADMSTR	9 DRIVER	10 MEN	11 FKLFT OP	12 CRANE OP	13 RIGGER	14 PARTS
0.00	1.00	1.00	1.00	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00	100.00
10.00	1.00	1.00	1.00	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00	100.00
60.00	1.00	1.00	.98	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00	100.00
120.00	1.00	.88	.96	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00	100.00
190.00	1.00	.81	.93	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00	99.97
240.00	1.00	.79	.93	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00	99.92
300.00	1.00	.80	.90	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00	99.84
370.00	1.00	.85	.93	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00	99.76
420.00	1.00	.85	.91	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00	99.71
480.00	1.00	.88	.92	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00	99.67
550.00	1.00	.87	.93	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00	99.62
600.00	1.00	.87	.92	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00	99.59
660.00	1.00	.77	.88	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00	99.54
730.00	1.00	.73	.90	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00	99.48
780.00	1.00	.77	.88	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00	99.43
840.00	1.00	.75	.90	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00	99.36
910.00	1.00	.72	.86	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00	99.29
960.00	1.00	.68	.83	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00	99.25
1020.00	1.00	.65	.83	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00	99.19
1090.00	1.00	.64	.85	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00	99.09
1140.00	1.00	.65	.84	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00	99.02
1200.00	1.00	.70	.80	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00	98.94
1270.00	1.00	.65	.82	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00	98.85
1320.00	1.00	.63	.85	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00	98.80
1380.00	1.00	.66	.84	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00	98.73
1440.00	1.00	.71	.83	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00	98.67

Figure 36. Functional Group Survivor Table for RUN #3

LINK RESULTS VS. TIME FOR REPLICATION 3

KEY: LINE1 = # OF ACTUAL USES (INCL. = 0 IF NOT IN CPLNK)
LINE2 = # OF TIMES WEAK BECAUSE ASSETS UNAVAILABLE
LINE3 = # OF TIMES WEAK, LIMITED BY NO. ALLOWED IN LINK
LINE4 = # OF TIMES = 0 IN COMPOUND LNK (THUS NOT COUNTED IN LINE1)
LINE5 = # OF AS-AVAILABLE USES (AS IN REPAIR)
LINE6 = NO. TIMES LIMITING IN AS-AVAILABLE USES

TIME	.HANDLO.(A) 1	.REPAIR. 2	.DRIVER. 3	.RADIO 4	.TELE 5	.TRUCK 6	.CRANE .OP 7	.RIGGER. 8	.R/T OP. 9	.FKLFT 10	.CRANE 11	.FKLFT .OP 12	.LOADMS.TR 13	.PARTS 14
0.00	0	0	0	50	0	50	50	50	50	50	50	50	50	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
10.00	0	0	0	50	0	50	50	50	50	50	50	50	50	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60.00	0	1	0	50	0	50	49	49	50	50	46	50	50	1
	0	0	0	0	0	0	0	0	0	0	0	0	1<<	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120.00	0	2	0	50	0	50	48	48	50	44	48	44	50	2
	0<<	0	0	0	0	0	0	0	0	0	0	0	2<<	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180.00	10	4	0	50	0	50	46	46	50	40	46	40	50	4
	10<<	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
240.00	13	5	0	50	0	50	47	47	50	37	47	37	50	5
	13<<	0	0	0	0	0	0	0	0	0	2<<	0	2<<	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	0	12	0	0	0	0	0	0	0	0	0	0	0	12
	0	3<<	0	0	0	0	0	0	0	0	0	0	0	0
300.00	11	10	0	50	0	50	46	46	50	39	46	39	50	10
	11<<	0	0	0	0	0	0	0	0	0	3<<	0	6<<	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	2<<	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	5<<	0	0	0	0	0	0	0	0	0	0	0	0
370.00	8	7	0	50	0	50	48	48	50	42	48	42	50	7
	8<<	0	0	0	0	0	1<<	0	0	2<<	4<<	0	2<<	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	0	7	0	0	0	0	0	0	0	0	0	0	0	7
	0	5<<	0	0	0	0	0	0	0	0	0	0	0	0
420.00	8	6	0	50	0	50	46	46	50	42	46	42	50	6
	3<<	0	0	0	0	0	0	0	0	2<<	2<<	0	4<<	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	0	7	0	0	0	0	0	0	0	0	0	0	0	7
	0	5<<	0	0	0	0	0	0	0	0	0	0	0	0
480.00	7	7	0	50	0	50	45	45	50	43	45	43	50	7
	7<<	1<<	0	0	0	0	0	0	0	1<<	1<<	0	5<<	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	0	6	0	0	0	0	0	0	0	0	0	0	0	6
	0	4<<	0	0	0	0	0	0	0	0	0	0	0	0
550.00	5	11	0	50	0	50	45	45	50	45	45	45	50	10
	5<<	4<<	0	0	0	0	1<<	0	0	2<<	1<<	0	4<<	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	3	0	0	0	0	0	0	0	0	1<<	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	1<<	0	0	0	0	0	0	0	0	0	0	0	0

Figure 37. LINK Summary Table for RUN #3

600.00	6	11	0	50	0	50	44	44	50	44	44	44	50	11
	6<<	0	0	0	0	0	1<<	0	0	2<<	1<<	0	9<<	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	0	3	0	0	0	0	0	0	0	0	0	0	0	3
	0	1<<	0	0	0	0	0	0	0	0	0	0	0	0
660.00	12	10	0	50	0	50	43	43	50	38	43	38	50	10
	12<<	0	0	0	0	0	0	0	0	1<<	0	0	8<<	0
	0	0	0	0	0	0	1<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	2<<	0	0	0
	0	6	0	0	0	0	0	0	0	0	0	0	0	6
	0	2<<	0	0	0	0	0	0	0	0	0	0	0	0
730.00	14	7	0	50	0	50	44	44	50	36	44	36	50	7
	14<<	0	0	0	0	0	0	0	0	2<<	0	0	5<<	0
	0	0	0	0	0	0	1<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	2<<	0	0	0
	0	8	0	0	0	0	0	0	0	0	0	0	0	8
	0	2<<	0	0	0	0	0	0	0	0	0	0	0	0
780.00	13	8	0	50	0	50	44	44	50	37	44	37	50	8
	13<<	0	0	0	0	0	0	0	0	2<<	0	0	6<<	0
	0	0	0	0	0	0	2<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	0	7	0	0	0	0	0	0	0	0	0	0	0	7
	0	2<<	0	0	0	0	0	0	0	0	0	0	0	0
840.00	14	8	0	50	0	50	45	45	50	36	45	36	50	8
	14<<	0	0	0	0	0	0	0	0	2<<	0	0	6<<	0
	0	0	0	0	0	0	2<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	0	8	0	0	0	0	0	0	0	0	0	0	0	8
	0	3<<	0	0	0	0	0	0	0	0	0	0	0	0
910.00	14	11	0	50	0	50	43	43	50	36	43	36	50	11
	14<<	0	0	0	0	0	0	0	0	4<<	0	0	7<<	0
	0	0	0	0	0	0	2<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	2<<	0	0	0
	0	6	0	0	0	0	0	0	0	0	0	0	0	6
	0	3<<	0	0	0	0	0	0	0	0	0	0	0	0
960.00	17	10	0	50	0	50	43	43	50	33	43	33	50	10
	17<<	0	0	0	0	0	0	0	0	3<<	1<<	0	5<<	0
	0	0	0	0	0	0	3<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	2<<	0	0	0
	0	10	0	0	0	0	0	0	0	0	0	0	0	10
	0	4<<	0	0	0	0	0	0	0	0	0	0	0	0
1020.00	17	13	0	50	0	50	44	44	50	33	44	33	50	13
	17<<	1<<	0	0	0	0	0	0	0	3<<	2<<	0	7<<	0
	0	0	0	0	0	0	3<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	0	10	0	0	0	0	0	0	0	0	0	0	0	10
	0	5<<	0	0	0	0	0	0	0	0	0	0	0	0
1090.00	19	13	0	50	0	50	42	42	50	31	42	31	50	13
	19<<	0	0	0	0	0	0	0	0	2<<	2<<	0	8<<	0
	0	0	0	0	0	0	2<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	2<<	0	0	0
	0	13	0	0	0	0	0	0	0	0	0	0	0	13
	0	5<<	0	0	0	0	0	0	0	0	0	0	0	0

Figure 37. LINK Summary Table for RUN #3 (cont'd)

1140.00	.	19	11	0	50	0	50	43	43	50	31	43	31	50	11
	.	19<<	0	0	0	0	0	0	0	0	3<<	2<<	0	6<<	0
	.	0	0	0	0	0	0	2<<	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	2<<	0	0	0
	.	0	12	0	0	0	0	0	0	0	0	0	0	0	12
	.	0	6<<	0	0	0	0	0	0	0	0	0	0	0	0
1200.00	.	16	15	0	50	0	50	41	41	50	34	41	34	50	15
	.	16<<	0	0	0	0	0	0	0	0	3<<	3<<	0	8<<	0
	.	0	0	0	0	0	0	1<<	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	5<<	0	0	0
	.	0	10	0	0	0	0	0	0	0	0	0	0	0	10
	.	0	7<<	0	0	0	0	0	0	0	0	0	0	0	0
1270.00	.	18	14	0	50	0	50	43	43	50	32	43	32	50	14
	.	18<<	1<<	0	0	0	0	0	0	0	3<<	4<<	0	5<<	0
	.	0	0	0	0	0	0	2<<	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	5<<	0	0	0
	.	0	10	0	0	0	0	0	0	0	0	0	0	0	10
	.	0	8<<	0	0	0	0	0	0	0	0	0	0	0	0
1320.00	.	19	11	0	50	0	50	45	45	50	31	45	31	50	11
	.	19<<	0	0	0	0	0	0	0	0	2<<	4<<	0	5<<	0
	.	0	0	0	0	0	0	1<<	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	4<<	0	0	0
	.	0	13	0	0	0	0	0	0	0	0	0	0	0	13
	.	0	8<<	0	0	0	0	0	0	0	0	0	0	0	0
1380.00	.	19	11	0	50	0	50	46	46	50	31	46	31	50	11
	.	19<<	0	0	0	0	0	0	0	0	3<<	5<<	0	4<<	0
	.	0	0	0	0	0	0	1<<	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	3<<	0	0	0
	.	0	12	0	0	0	0	0	0	0	0	0	0	0	12
	.	0	8<<	0	0	0	0	0	0	0	0	0	0	0	0
1440.00	.	15	14	0	50	0	50	45	45	50	35	45	35	50	14
	.	15<<	0	0	0	0	0	0	0	0	4<<	5<<	0	7<<	0
	.	0	0	0	0	0	0	1<<	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	3<<	0	0	0
	.	0	7	0	0	0	0	0	0	0	0	0	0	0	7
	.	0	8<<	0	0	0	0	0	0	0	0	0	0	0	0

Figure 37. LINK Summary Table for RUN #3 (cont'd)

mission (line #1 in the link-use table) and using available personnel and equipment (line #5).

Finally, the end-of-encounter summaries show the average number of failures, repairs ordered, repairs completed, and status of repair at the final time point (1440.).

The complete output from RUN #3 is contained in Appendix D.

B. PREFAIL Excursion

A number of excursions (corollary runs to study the sensitivity of results to specific parameters) are often suggested by the results of an AURA run. Two excursions were conducted for RUN #3: First, to illustrate the PREFAIL option, a "PREFAIL-ON" run was done. Secondly, the sensitivity of results to a limitation in the number of repair parts was conducted.

The runs conducted thus far have assumed that all deployed equipment (and personnel) were all available at the beginning of each replication. In the case of time-dependent failure and repair, it may be more realistic for some studies to assume that repairable failures and then subsequent repairs have occurred before the time period of the AURA run. It can be shown that, given sufficient time, the expected fraction, f, of equipment which are awaiting repairs given by:

$$f = F/(F + R) \qquad (1)$$

where F is the failure rate, and R the repair rate for each type of equipment and particular mode of failure or repair.

When the PREFAIL option is not turned OFF, AURA uses the values of f as a probability function for each type of "fail and repairable" equipment. A Monte Carlo technique uses these values to preselect equipment failures before commencing each replication. Items designated as failures are then available for repair at the onset of the encounter.

C. Limited Repair Parts

A final excursion, RUN #3B, was made on the Failure-Repair example (RUN #3). In this excursion, the initial number of PARTS was decreased from 100. to 2.

The results from this excursion are shown in Figure 37. At first glance, there appears to be essentially no difference between RUNs #3 and #3B. This is certainly to be expected, since the mean times between failures (750 and 1080 minutes for the FKLFT and CRANE respectively) are fairly long in the time scale of the runs. In fact, even with unlimited repair parts, the END-OF-ENCOUNTER-SUMMARY for RUN #3 (contained in Appendix D) shows an average total of only 1.9 repairs ordered, and less than 1.5 completed. However, as time progressed, one would expect the lack of repair parts to become more critical. In fact, as seen in Figure 38, the results of the runs are beginning to diverge as the

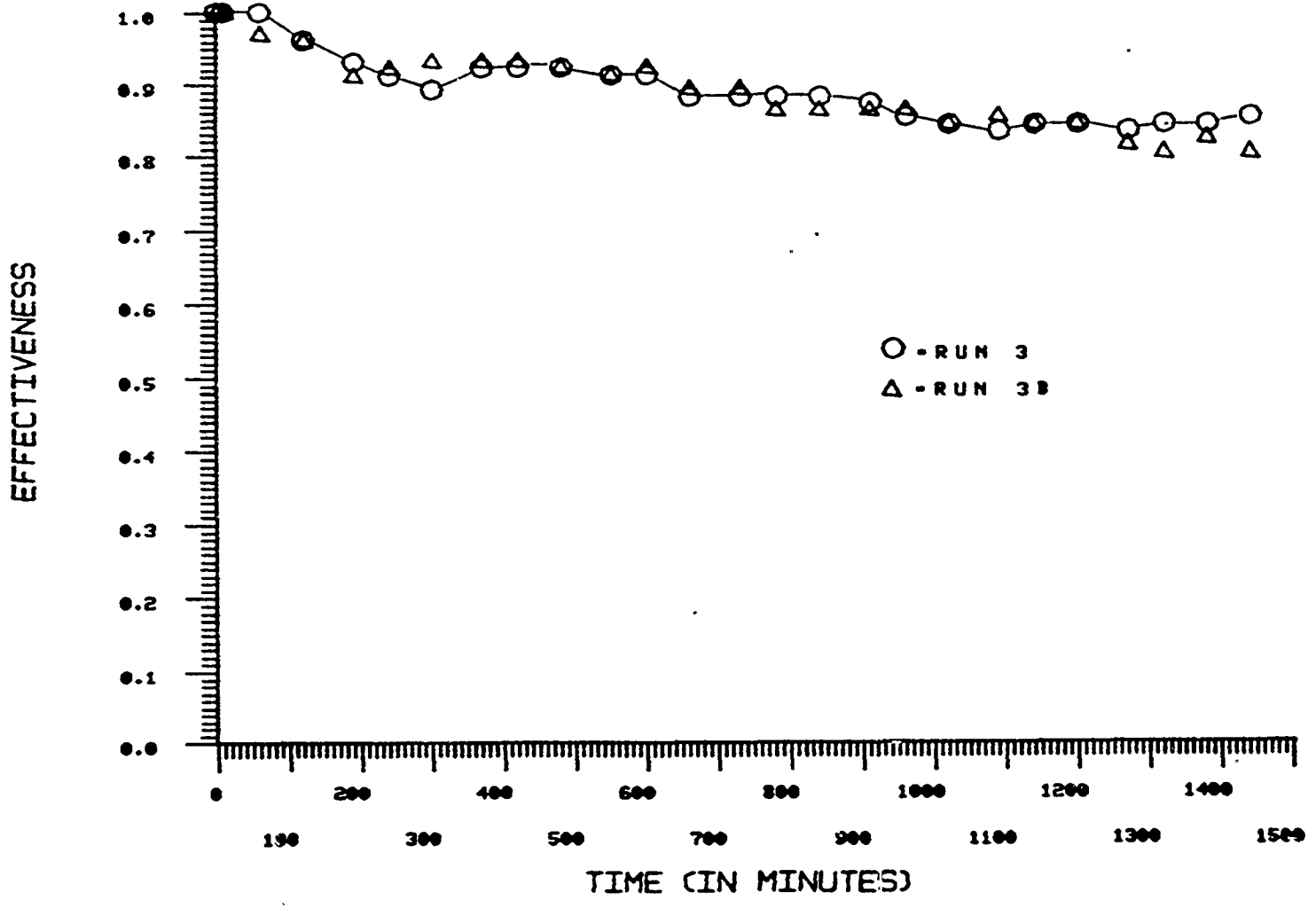

Figure 38. Graphic Comparison of RUN #3 and RUN #3B Average Unit Effectiveness

encounter time exceeds the characteristic failure times of the equipment.

VIII. ATTACKING WITH FRAGMENTING/HIGH EXPLOSIVE MUNITIONS

A. General

In this section, the scenario being built around the example unit is extended to include an attack on the unit with area coverage munitions. The munitions employed in this chapter are "conventional" (fragmenting, high explosive), but the modeling of their delivery is similar to the delivery of nuclear or chemical warheads. The input requirements for modeling the immediate response of personnel to incoming area munitions, viz, to change posture, is also similar for all area munitions. We will take advantage of these similarities in discussing weapon delivery and posture change models in this chapter.

On the other hand, the result of warhead detonation, and the modeling of posture change effects are quite different, and must therefore be represented by markedly different models. Conventional lethality models are discussed in Section VIII.E. of this chapter; nuclear and chemical effects are left for subsequent chapters.

B. Target Location and Warhead Delivery Errors

In the delivery of warheads to an area target (for example, firing rockets at the example unit), there are a number of rather independent sources of error. First, the actual location of the target is imperfectly known. For example, if the perceived location is based upon triangulation of an intercepted radio signal, the probable errors inherent in the process show up as probable errors in aimpoint.

Secondly, inaccuracies in the delivery systems result in two types of delivery errors. One type, called correlated errors, applies to those rounds in an associated set, such as in a volley. This type of error could be caused by an error in meteorological data, which affects the delivery of all rounds. The second type, independent, applies to any effects which result in round-to-round deviations.

AURA accounts for target location errors (TLE) and delivery errors independently, using a Monte Carlo approach. At the beginning of each iteration, random numbers are drawn and multiplied by the user-input TLE standard deviations to determine specific target location errors (range and deflection). This set of TLE remains in effect for the duration of the iteration, unless caused to be replaced by a TLE-change event. (A TLE-change event might be used to model the effect of a mid-encounter move or change in signature.)

Similarly, random number draws, multiplied by standard deviations, are used to develop specific values for delivery errors. For each set of rounds designated as a volley, specific range and deflection errors are calculated. In addition, each round has an independent set of range and deflection errors randomly derived. The standard deviations used to

derive correlated and independent errors are user-input for each weapon type. Like the standard deviations for TLE, the standard deviations for correlated and independent errors can be changed by a user-input delivery error change event to model, for example, a mid-encounter change in accuracy due to a change in range.

The total error for any specific round is then given by the sum of the target location, correlated, and independent delivery errors. The errors are applied to the user-designated aimpoint (for example, the radio location in the case of radio intercept targeting) to determine the actual burst point for each munition. The height-of-burst, which depends only upon the designated height and round-to-round variation (independent error), is also randomly calculated.

Although the above discussion has referred only to standard deviations, there are distributional and input format options available. The most common distribution is the bivariate Gaussian. In this option, independent random numbers are drawn from a normal distribution and multiplied by user-input standard deviations to determine specific range and deflection errors.

Normally distributed random numbers are also used with the CEP (circular error probable) format options. The user-input CEP values are internally converted to equivalent standard deviations before processing as above.

In some studies, it may be desirable to model some of the errors as being uniformly distributed. For example, in studying the resiliency of a unit that has no salient signature point, it might be appropriate to specify an area in which an aimpoint is randomly selected. As another example, consider a weapon system which is designed to uniformly scatter submunitions over an area. This can be modeled as a volley of submunitions having a normally distributed correlated error that reflects the delivery error of the carrier and uniformly distributed independent errors to model the uniform random dispersal of submunitions. AURA allows the user to designate uniformly distributed deviations by prefixing the input value with a minus (-) sign. Any value so designated is taken as the amplitude, A, of the error distribution: any specific error will lay between +/- A.

```
DELIVERY ERROR
WEAPON NAME, (t), REI, REC, DEI, DEC, HOB

where (t) is the time for a change-event (optional)
      REI is the range error, independent
      REC is the range error, correlated
      DEI is the deflection error, independent
      DEC is the deflection error, correlated
      HOB is the height of burst error
```

C. Coordinate Systems

The above discussion implied the existence of a new coordinate system, namely range - deflection. In fact, there are three coordinate systems used in AURA. The primary system is the cartesian, X-Y, coordinate system in which the target deployment is specified. Recall that both the origin and scale unit of length are established by the user; however, it is strongly recommended that a convenient point in the target area be used as the origin, a convenient direction for the X-axis, and one meter be used as the unit of length.

Weapon effects and delivery errors are dependent not on the user's choice for X-axis direction but on the direction of the incoming fire. This direction defines an axis called RANGE, which is positive in the incoming direction of the threat: the direction counter-clockwise (right-handed) perpendicular to RANGE is the positive DEFLECTION direction. Orientation of the RANGE-DEFLECTION coordinate system is established by the user by specifying the angle between the unit X-axis and the RANGE axis. The unit of length for the RANGE-DEFLECTION system must be the same as that for X-Y (meters). Finally, the origin of the RANGE-DEFLECTION system is moved, by AURA, to the appropriate X-Y point for each application. For example, an aimpoint error - specified in range and deflection - is measured from the actual target (X-Y) aimpoint. The relationship between the X-Y and RANGE-DEFLECTION systems is shown in Figure 3 9.

The third coordinate system, DOWNWIND-CROSSWIND, is very similar to RANGE- DEFLECTION, the only difference being the substitution of the WIND DIRECTION angle for the INCOMING FIRE DIRECTION angle. DOWNWIND-CROSSWIND is used for the chemical weapon effects described in Volume II.

Usages of the various coordinate systems is summarized in Table 2.

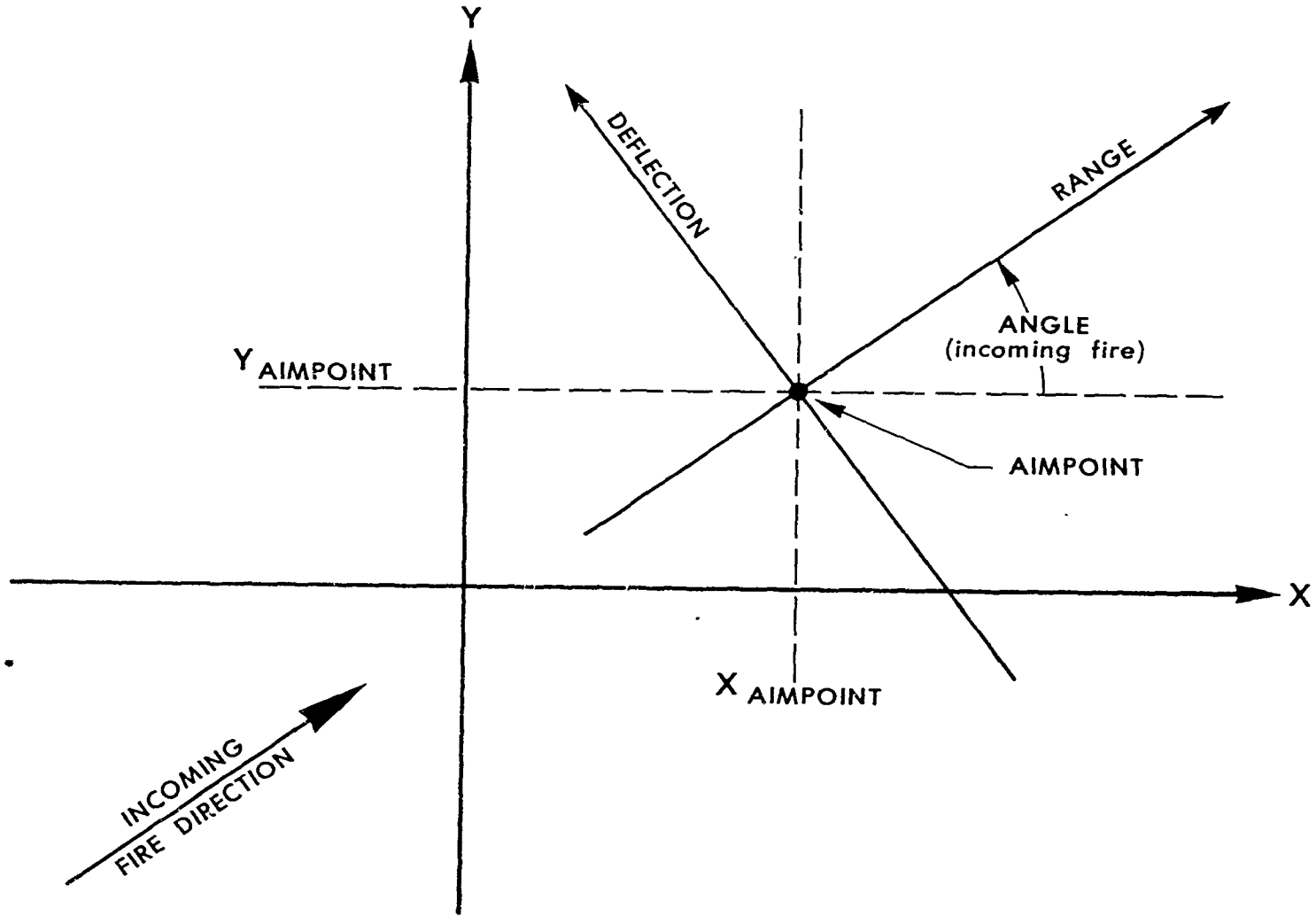

Figure 39. Relationship between the X-Y and RANGE-DEFLECTION Coordinate Systems

TABLE 2. COORDINATE SYSTEMS FOR GEOGRAPHICALLY RELATED PARAMETERS

PARAMETER	COORDINATE SYSTEM	COMMENT
Deployment of items	X-Y	Defines X-Y system
Aimpoint	X-Y	e.g. Signature point
Target location error	RANGE-DEFLECTION	Measured from Aimpoint
Delivery errors	RANGE-DEFLECTION	Measured from Aimpoint
Burst point of munition	X-Y	Internally computed by AURA
Conventional weapon effects (Lethal radii)	RANGE-DEFLECTION	Measured from burst point
Chemical contamination and vapor clouds	DOWNWIND-CROSSWIND	Measured from burst point
Volley parameters (length, angle, movement)	RANGE-DEFLECTION	See Section VIII C

D. Specification of Incoming Fire - ROUND and VOLLEY

Two options exist for specifying the arrival of incoming rounds, the ROUND and VOLLEY inputs. Of these, the ROUND option, specifying the arrival of one warhead, is the simpler. The format for the ROUND input is:

WEAPON NAME, TIME OF ARRIVAL, AIMPOINT (X,Y AND Z)

As noted in Table 2, the aimpoint is in the X-Y (target) coordinate system.

It quite often happens, however, that a correlated group of rounds arrives - such as rounds in a volley or bomblets in a common carrier. Such cases may be modeled as designated aimpoints in a pattern, with the pattern centered about a volley aimpoint. In AURA, the pattern shape is taken to be a line, with length and angle (with respect to the incoming fire (RANGE) direction) user specified. The format for VOLLEY input is:

WEAPON NAME, TIME OF ARRIVAL, X_A, Y_A, Z_A, NR, ANG, LENGTH

where

X_A, Y_A, Z_A is the designated aimpoint

NR is the number of rounds in the volley

ANG is the angle between the volley line and the incoming (RANGE) direction, and

LENGTH is the length of the volley line.

The angle, ANG, allows the modeling of markedly different delivery means. For example, an artillery barrage customarily attempts to lay a line of impact points perpendicular to the RANGE (incoming fire) direction: this line is then moved (walked) in the range direction. On the other hand, an aircraft laying a stick of bombs lays them parallel to the incoming direction.

The actual burst points of the munitions differs from their intended burst points because of the errors described above. First, the actual location of the unit relative to the perceived location is a random variable (in X and Y), dictated by the target location error. Then, the center point of the volley pattern - the pattern aimpoint - differs by a random amount (in RANGE and DEFLECTION), as driven by the correlated delivery errors. Finally, each round burst point differs from its designated point in the pattern by its randomly chosen independent error (in RANGE and DEFLECTION).

The ability to specify uniform and/or normally distributed patterns about a designated line of points gives a fair amount of flexibility to the threat input. For example, in this chapter, a conventional threat is delivered against the example unit. The threat chosen consists of two improved conventional munition (ICM) warheads, each carrying 42 bomblets. Each ICM was modeled as a volley of 42 rounds. Since all rounds emanate from the same point, the volley length was set to 0.; the volley angle (immaterial for a zero-length volley) was set at 90. degrees. One ICM, arriving at time 1., was aimed at the center of the unit (40.,40.); the second, at time 300., was aimed at the RADIO location (0.,0.). The correlated delivery error, which accounts for the delivery error of the carrier warhead, was set at 160 meters in range and 80 meters in deflection, both being standard deviations from a normal distribution. The independent error was used to randomly distribute the 42 bomblets in a pattern about the actual burst point; the pattern is uniformly distributed +/- 50 meters in range and +/- 25 meters in deflection.

The runstream to input this data is shown in Figure 40.

E. Conventional Lethality

The lethality of a high explosive, fragmenting warhead is a complicated function of a number of diverse parameters, such as target-warhead spatial relationship; warhead orientation; terminal velocity and functioning characteristics (blast and fragment patterns); target posture and defeat criterion; and atmospheric effects. The Joint Technical Coordinating Group for Munitions Effects (JTCG/ME) has standardized methodologies for evaluating lethality; the outputs of those methodologies involve evaluations of the probability that a warhead above a specified point on the ground, at a specified height-of-burst (HOB),

```
100 VOLLEY
110 WRHDICM,1.0,40.,40.,0.,42,90.,0.
120 WRHDICM,300.,0.,0.,0.,42,90.,0.
130 END
140 DELIVERY ERRORS
150 WRHDICM,-50.,160.,-25.,80.,0.
160 END
170 CONVENTIONAL LETHALITY INPUT
 9 END
```

Figure 40. RUNSTREAM for Incoming Fire Data

with a given set of characteristics, will cause a specified level of damage (kill criterion) to a fixed target in a specified posture. By repeating such evaluations for many different points on the ground, a map of kill probabilities (P_k) can be drawn. (The areal integral of those kill probabilities over all points on the ground yields the commonly used lethal area (A_L) or mean area of effectiveness (MAE) value.)

There are several ways of representing a kill probability map for use in AURA. An overly detailed (currently disabled) technique is to input a comprehensive grid of P_k values for every weapon-target-posture-kill criteria-HOB combination. AURA places the appropriate grid about every target and evaluates the probability of every incoming weapon against the target. As expected, such a technique is grossly demanding of computer storage space and has less detailed techniques.

The other techniques for representing the P_k maps basically amount to fitting those maps with simple functions in range and deflection, such that the approximate P_k of a warhead detonation is quickly found from the range and deflection to the target, the HOB, and the target posture and kill criterion. In AURA, two kinds of simple functions can be used: Carleton (exponential) functions and sets of one or more concentric step functions. (Examples of these are shown in Figure 41). Various functional forms can be mixed in the same conventional lethality data file for a given AURA run. For more on fitting of functions to P_k maps, see Reference 6.

The mnemonic command CONVENTIONAL causes AURA to read conventional lethality data from input channel 2. The format of such data is:

---

[6] JTCG/ME, "Simplified Weapons Evaluation (QUICKIE) Computer Program," 61 JTCG/ME-77-1, 25 February 1977.

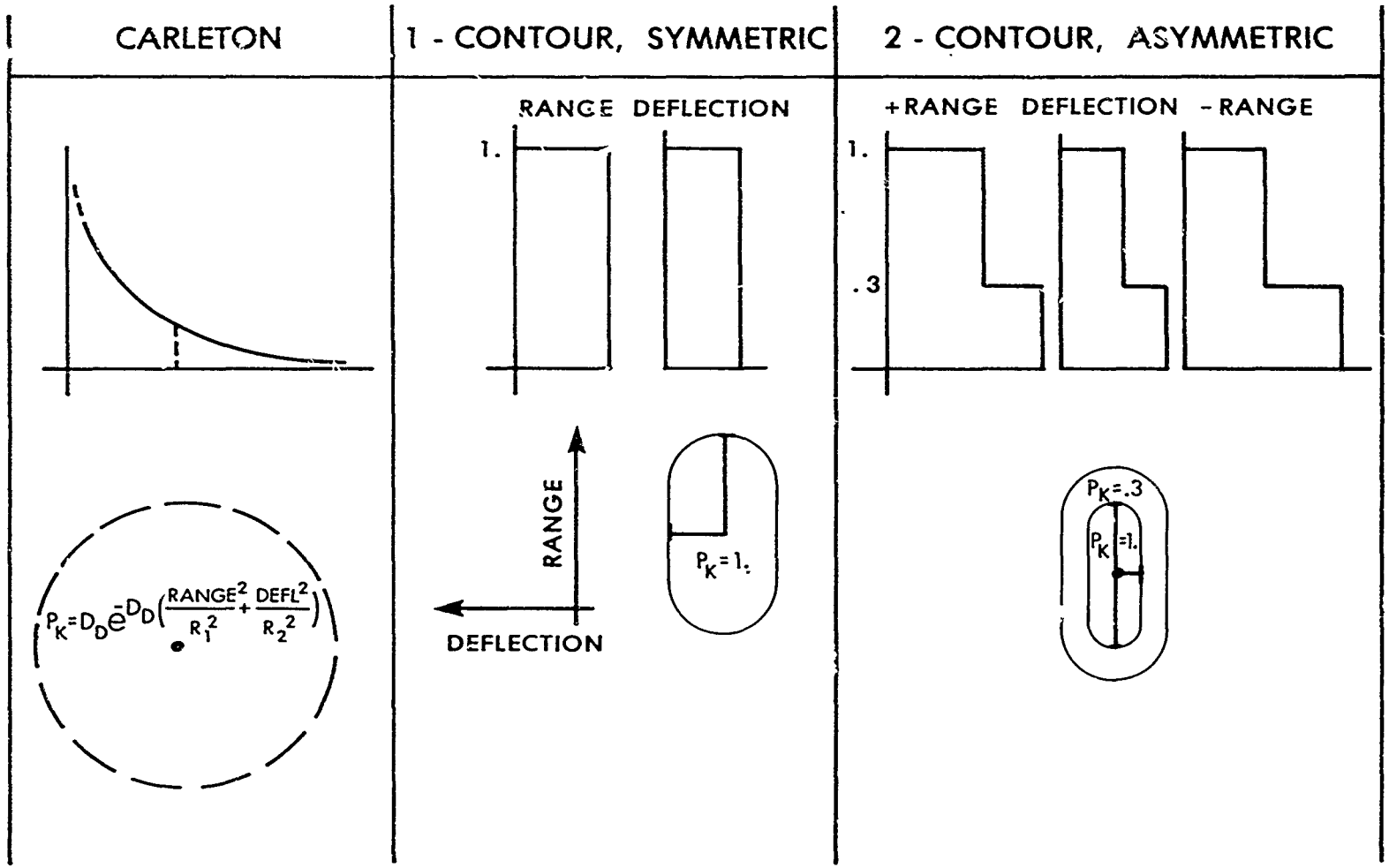

Figure 41. Examples of Carleton and Concentric Step Functions

```
WEAPON 1
TARGET 1, DATA TYPE CODE 1
NHOB, <----Heights (meters)
NPOS, <----Descriptions
NCRIT,<----Descriptions

  NHOB*NPOS*NCRIT
                                                    NCRIT
   data lines                                 NPOS
                                                    NCRIT
TARGET 2, DATA TYPE CODE 2          NHOB            NCRIT
NHOB, <----Heights                         NPOS
  .
  .
  .
  .
END
WEAPON 2
TARGET 1, DATA TYPE CODE 1
  .
  .
  .
  .
  .
END
END
```

Here, NHOB is the number of heights of burst, NPOS is the number of postures, and NCRIT is the number of kill criteria for which data is being input. The code numbers, which indicate the form of the data for each weapon-target combination, are listed in Table 3.

A final comment must be made about the apparently prodigious amount of data involved in conventional lethality. The methodologies used and parameters available do allow the user to portray highly detailed effects and differentiate between fairly subtle parameters; such capability might be necessary for evaluating highly technical developments (e.g. the effectiveness of a new fuse). However, such detail is not necessary for AURA to run. In the more usual case, a single HOB, posture, kill criteria, and a single P_k and radius for each weapon-target type is sufficient. This is, in fact, the lowest level of detail at which data readily are available (e.g., in JTCG/ME manuals). Any attempt to use a more general probability of kill, or to use one in a more general fashion, requires an amount of modeling and pre-processing be done off-line in order to derive appropriate values for the generalized parameters. The philosophy in building AURA was to avoid off-line modeling by incorporating within AURA itself sufficient coding to take the standard data that do exist in the form in which they exist.

Figure 42 contains conventional lethality data for the example unit. The warhead, called WRHDICM, was listed as a weapon in REPERTOIRE; target items, FKLFT, TRK, TALKY, PERSONNEL, and PARTS, were

TABLE 3. DATA TYPES

CODE NO.	DESCRIPTION	NO. OF PARAMETERS	COMMENTS
1	Complete grid	--	Currently disabled
2	Carleton-von Neuman	3	"Peak" Probability plus exponential constants in range and deflection
3	Step function	3	Probability (P), radius in RANGE (R_X), radius in DEFLECTION (R_Y)
4	Special system	--	Currently disabled
5	2-step function	6	P_1, R_{X1}, R_{Y1}, P_2, R_{X2}, R_{Y2}
6	3-step function	9	P_1, R_{X1}, R_{Y1}, P_2, R_{X2}, R_{Y2}, P_3, R_{X3}, R_{Y3}
7	Asymmetric Carleton	4	Like 2, but different exponential constants for + and - range
8	Asymmetric step function	4	P_1, R_X^-, R_Y, R_X^+
9	Asymmetric 2-step function	8	P_1, R_{X1}^-, R_{Y1}, R_{X1}^+, P_2, R_{X2}^-, R_{Y2}, R_{X2}^+
10	Asymmetric 3-step function	12	P_1, R_{X1}^-, R_{Y1}, R_{X1}^+, P_2, R_{X2}^-, R_{Y2}, R_{X2}^+, P_3, R_{X3}^-, R_{Y3}, R_{X3}^+

CONVENTIONAL LETHALITY DATA

```
WRHDICM
FKLFT,5
1,0.
1,OPEN
3,HEAVY,MEDIUM,LITE
1.,3.37,3.37,.3,15.06,15.06
1.,3.52,3.52,.3,47.18,47.18
1.,3.53,3.53,.3,47.88,47.88
TRK,5
1,0.
1,OPEN
3,HEAVY,MEDIUM,LITE
1.,3.42,3.42,.3,24.89,24.89
1.,3.52,3.52,.3,51.42,51.42
1.,3.53,3.53,.3,52.11,52.11
TALKY,5
1,0.
1,OPEN
1,INCAPACITATE
1.,2.96,2.96,.3,19.84,19.84
PERSONNEL,3
1,0.
2,OPEN,PRONE
1,INCAPACITATE
1.,13.06,13.06
1.0, 5.0,5.0
PARTS,3
1,0.
1,ONLY
1,INCAPACITATE
1.0,7.68,7.68
END
```

Figure 42. Conventional Lethality Data for the Example Case

listed as assets. Notice that TALKY and PERSONNEL were not unique names but served to relate one set of lethality data to several assets. Two data types, 3 and 5, were used to demonstrate mixing of data formats. A single HOB, posture, and kill criteria - and hence a single data line - was used for TALKY and PARTS. Personnel data was input for two postures, OPEN and PRONE, thus requiring two data lines. Finally, three kill criteria, corresponding to TOTAL LOSS, AT LEAST MEDIUM DAMAGE, and AT LEAST LIGHT DAMAGE, were input for the repairable items. Notice that such data is sequentially inclusive; AT LEAST LIGHT DAMAGE includes MEDIUM and TOTAL DAMAGE. This format is essential to interface with standard vulnerability evaluation techniques.

F. RUN #4 - Results

The addition of conventional attacks on the example unit caused several changes in the output of the AURA run. The first, of course, was to add new lines to the event table (Figure 43) and to add a weapon table to the "repeat-of-input" printout. There follows sixty-four pages of intermediate results detailing every damage and casualty in each of the fifty replications, along with all information on the round which caused it. The printing of this information was caused by turning CASUALTIES, ON under the OUTPUT mnemonic. This detailed printout also includes casualties resulting from non-hostile causes, such as the reliability failures which were seen in RUN #3.

Comparing the final, encounter results of RUN #3 (Figure 35) with RUN #4, one first notices a generally lower set of effectiveness values, with marked decreases at times 11. and 310., resulting from the lethality events at times 1. and 300.. The frequency distribution of results shows a greater spread, including some replications in which the effectiveness decreased to 0. (Recall that the minimum effectiveness in a non-hostile environment was 0.4.) The reason for the appearance and disappearance of 0. effectiveness becomes apparent by studying the succeeding outputs.

The next table, FUNCTIONAL GROUP SURVIVORS, (Figure 44) from RUN #4 markedly differs from that in RUN #3 (Figure 36). Whereas only those assets which failed showed any decrease in RUN #3, all assets had losses in RUN #4. In particular, the average number of R/T OPs decreased from 1. to .96 at time 11., and to .90 at time 310.. These numbers, averaged over 50 replications, indicate that the sampling of weapon delivery errors, in some replications, resulted in warhead burst points which caused R/T OP casualties. In fact, since the lethality file (from input channel 2) specifies only $P_k = 1.$ or $P_k = 0.$ for personnel, there must have been exactly 2 replications which produced an R/T OP casualty at time 1. and 3 additional replications resulting in R/T OP casualties at time 300. Since the CASUALTY output option was turned on for this run, the occurrence of the R/T OP casualties was printed out in the intermediate results, as discussed above. Perusal of that output revealed the specific 5 replications in which R/T OP casualties occurred.

The next table, LINK RESULTS (Figure 45), also differs from that in RUN #3 (Figure 37). At time 11., after the first lethality event, a number of links have recorded weak replications. The repair capability

EVENT	TIME	EVENT TYPE	OPERANT CHAINS	WPN TYPE/ RECUPTIME	NO.RNDS/ +/- RAM	DGZ/TLE X	DGZ/TLE Y	DGZ/TLE Z	VOLLEY ANGLE	VOLLEY LENGTH	JEVNT		
1	0.00	INITIAL	1								0	0	0
2	0.00	USER RCNST	1								999	0	0
3	1.00	CONV. LETH	1	1	42	40.00	40.00	0.00	90.00	0.00	1	1	1
4	11.00	RCNSTITUTE	1	10.00							0	0	1
5	61.00	RCNSTITUTE	1	60.00							0	0	2
6	121.00	RCNSTITUTE	1	120.00							0	0	3
7	180.00	USER RCNST	1								999	0	0
8	190.00	RCNSTITUTE	1	189.00							0	0	1
9	240.00	RCNSTITUTE	1	239.00							0	0	2
10	300.00	CONV. LETH	1	1	42	0.00	0.00	0.00	90.00	0.00	1	2	2
11	310.00	RCNSTITUTE	1	10.00							0	0	1
12	360.00	USER RCNST	1								999	0	0
13	370.00	RCNSTITUTE	1	70.00							0	0	1
14	420.00	RCNSTITUTE	1	120.00							0	0	2
15	480.00	RCNSTITUTE	1	180.00							0	0	3
16	540.00	USER RCNST	1								999	0	0
17	550.00	RCNSTITUTE	1	250.00							0	0	1
18	600.00	RCNSTITUTE	1	300.00							0	0	2
19	660.00	RCNSTITUTE	1	360.00							0	0	3
20	720.00	USER RCNST	1								999	0	0
21	730.00	RCNSTITUTE	1	430.00							0	0	1
22	780.00	RCNSTITUTE	1	480.00							0	0	2
23	840.00	RCNSTITUTE	1	540.00							0	0	3
24	900.00	USER RCNST	1								999	0	0
25	910.00	RCNSTITUTE	1	610.00							0	0	1
26	960.00	RCNSTITUTE	1	660.00							0	0	2
27	1020.00	RCNSTITUTE	1	720.00							0	0	3
28	1080.00	USER RCNST	1								999	0	0
29	1090.00	RCNSTITUTE	1	790.00							0	0	1
30	1140.00	RCNSTITUTE	1	840.00							0	0	2
31	1200.00	RCNSTITUTE	1	900.00							0	0	3
32	1260.00	USER RCNST	1								999	0	0
33	1270.00	RCNSTITUTE	1	970.00							0	0	1
34	1320.00	RCNSTITUTE	1	1020.00							0	0	2
35	1380.00	RCNSTITUTE	1	1080.00							0	0	3
36	1440.00	RCNSTITUTE	1	1140.00							0	0	4

Figure 43 Event Table for RUN #4

ASSET SURVIVORS - INCLUDING CONTAMINATED - VS. TIME FOR REPLICATION 0

TIME	TRUCK 1	FKLFT 2	CRANE 3	RADIO 4	ALARM 5	TELE 6	R/T OP 7	LOADMS TR 8	DRIVER 9	MEN 10	FKLFT OP 11	CRANE OP 12	RIGGER 13	PARTS 14
0.00	1.00	1.00	1.00	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00	100.00
11.00	.89	.79	.75	.91	1.82	.91	.94	.90	.91	5.48	.90	.92	.92	98.00
61.00	.89	.75	.71	.91	1.82	.91	.94	.90	.91	5.48	.90	.92	.92	98.00
121.00	.89	.67	.66	.91	1.82	.91	.94	.90	.91	5.48	.90	.92	.92	97.99
190.00	.89	.65	.66	.91	1.82	.91	.94	.90	.91	5.48	.90	.92	.92	97.95
240.00	.89	.65	.66	.91	1.82	.91	.94	.90	.91	5.48	.90	.92	.92	97.87
310.00	.81	.52	.61	.83	1.70	.83	.86	.84	.86	5.14	.86	.84	.86	95.77
370.00	.81	.49	.61	.83	1.70	.83	.86	.84	.86	5.14	.86	.84	.86	95.72
420.00	.81	.44	.61	.83	1.70	.83	.86	.84	.86	5.14	.86	.84	.86	95.67
480.00	.81	.46	.62	.83	1.70	.83	.86	.84	.86	5.14	.86	.84	.86	95.61
550.00	.81	.50	.65	.83	1.70	.83	.86	.84	.86	5.14	.86	.84	.86	95.51
600.00	.81	.52	.67	.83	1.70	.83	.86	.84	.86	5.14	.86	.84	.86	95.45
660.00	.81	.52	.65	.83	1.70	.83	.86	.84	.86	5.14	.86	.84	.86	95.39
730.00	.81	.56	.61	.83	1.70	.83	.86	.84	.86	5.14	.86	.84	.86	95.33
780.00	.81	.59	.62	.83	1.70	.83	.86	.84	.86	5.14	.86	.84	.86	95.27
840.00	.81	.57	.63	.83	1.70	.83	.86	.84	.86	5.14	.86	.84	.86	95.20
910.00	.81	.53	.62	.83	1.70	.83	.86	.84	.86	5.14	.86	.84	.86	95.14
960.00	.81	.56	.66	.83	1.70	.83	.86	.84	.86	5.14	.86	.84	.86	95.08
1020.00	.81	.54	.64	.83	1.70	.83	.86	.84	.86	5.14	.86	.84	.86	95.01
1090.00	.81	.53	.64	.83	1.70	.83	.86	.84	.86	5.14	.86	.84	.86	94.94
1140.00	.81	.53	.67	.83	1.70	.83	.86	.84	.86	5.14	.86	.84	.86	94.89
1200.00	.81	.58	.68	.83	1.70	.83	.86	.84	.86	5.14	.86	.84	.86	94.81
1270.00	.81	.61	.68	.83	1.70	.83	.86	.84	.86	5.14	.86	.84	.86	94.74
1320.00	.81	.63	.67	.83	1.70	.83	.86	.84	.86	5.14	.86	.84	.86	94.71
1380.00	.81	.63	.68	.83	1.70	.83	.86	.84	.86	5.14	.86	.84	.86	94.68
1440.00	.81	.64	.70	.83	1.70	.83	.86	.84	.86	5.14	.86	.84	.86	94.63

Figure 44. Functional Group Survivor Table for RUN #4

LINK RESULTS VS. TIME FOR REPLICATION 0

KEY: LINE1 = # OF ACTUAL USES (INCL. = 0 IF NOT IN CPLNK)
LINE2 = # OF TIMES WEAK BECAUSE ASSETS UNAVAILABLE
LINE3 = # OF TIMES WEAK, LIMITED BY NO. ALLOWED IN LINK
LINE4 = # OF TIMES = 0 IN COMPOUND LNK (THUS NOT COUNTED IN LINE1)
LINE5 = # OF AS-AVAILABLE USES (AS IN REPAIR)
LINE6 = NO. TIMES LIMITING IN AS-AVAILABLE USES

TIME	HANDLOAD 1	REPAIR 2	DRIVER 3	RADIO 4	TELE 5	TRUCK 6	CRANE OP 7	RIGGER 8	R/T OP 9	FKLFT 10	CRANE 11	FKLFT OP 12	LOADMS TR 13	PARTS 14
0.00	0	0	0	50	0	50	50	50	50	50	50	50	50	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
11.00	9	7	0	50	0	50	34	34	50	38	34	38	50	7
	2<<	5<<	0	2<<	0	6<<	0	0	3<<	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	2<<	0	0	0
	0	3	0	0	0	0	0	0	0	0	0	0	0	3

Figure 45. LINK Summary Table for RUN #4

	. 0	14<<	0	0	0	0	0	0	0	0	0	0	0	1<<
61.00	. 13	9	0	50	0	50	33	33	50	37	33	37	50	9
	. 5<<	1<<	0	5<<	0	6<<	0	0	0	1<<	0	0	4<<	0
	. 0	0	0	0	0	0	1<<	0	0	0	0	0	0	0
	. 0	0	0	0	0	0	0	0	0	0	3<<	0	0	0
	. 0	18	0	0	0	0	0	0	0	0	0	0	0	18
	. 0	13<<	0	0	0	0	0	0	0	0	0	0	0	1<<
121.00	. 17	11	0	50	0	50	31	31	50	33	31	33	50	11
	. 9<<	1<<	0	5<<	0	6<<	0	0	0	1<<	0	0	6<<	0
	. 0	[illegible]	0	0	0	0	1<<	0	0	0	0	0	0	0
	. 0	[illegible]	0	0	0	0	0	0	0	0	3<<	0	0	0
	. 0	20	0	0	0	0	0	0	0	0	0	0	0	20
	. 0	12<<	0	0	0	0	0	0	0	0	0	0	0	1<<
190.00	. 18	12	0	50	0	50	32	32	50	32	32	32	50	12
	. 11<<	1<<	0	5<<	0	6<<	0	0	0	1<<	2<<	0	7<<	0
	. 0	0	0	0	0	0	1<<	0	0	0	0	0	0	0
	. 0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	. 0	21	0	0	0	0	0	0	0	0	0	0	0	21
	. 0	13<<	0	0	0	0	0	0	0	0	0	0	0	1<<
240.00	. 18	15	0	50	0	50	30	30	50	32	30	32	50	15
	. 11<<	1<<	0	5<<	0	6<<	0	0	0	1<<	1<<	0	9<<	0
	. 0	0	0	0	0	0	2<<	0	0	0	0	0	0	0
	. 0	0	0	0	0	0	0	0	0	0	2<<	0	0	0
	. 0	19	0	0	0	0	0	0	0	0	0	0	0	19
	. 0	14<<	0	0	0	0	0	0	0	0	0	0	0	1<<
310.00	. 16	16	0	50	0	50	24	24	50	28	24	28	50	16
	. 10<<	4<<	0	4<<	0	9<<	1<<	0	5<<	2<<	3<<	0	3<<	0
	. 0	0	0	0	0	0	2<<	0	0	0	0	0	0	0
	. 0	0	0	0	0	0	0	0	0	0	3<<	0	0	0
	. 0	24	0	0	0	0	0	0	0	0	0	0	0	24
	. 0	25<<	0	0	0	0	0	0	0	0	0	0	0	2<<
370.00	. 23	14	0	50	0	50	30	30	50	25	30	25	50	14
	. 13<<	1<<	0	9<<	0	9<<	0	0	0	1<<	5<<	0	3<<	0
	. 0	0	0	0	0	0	2<<	0	0	0	0	0	0	0
	. 0	0	0	0	0	0	0	0	0	0	3<<	0	0	0
	. 0	26	0	0	0	0	0	0	0	0	0	0	0	26
	. 0	23<<	0	0	0	0	0	0	0	0	0	0	0	2<<
420.00	. 26	14	0	50	0	50	32	32	50	22	32	22	50	14
	. 16<<	1<<	0	9<<	0	9<<	0	0	0	1<<	6<<	0	3<<	0
	. 0	0	0	0	0	0	2<<	0	0	0	0	0	0	0
	. 0	0	0	0	0	0	0	0	0	0	2<<	0	0	0
	. 0	27	0	0	0	0	0	0	0	0	0	0	0	27
	. 0	23<<	0	0	0	0	0	0	0	0	0	0	0	2<<
480.00	. 26	13	0	50	0	50	32	32	50	22	32	22	50	13
	. 17<<	1<<	0	9<<	0	9<<	0	0	0	1<<	7<<	0	2<<	0
	. 0	0	0	0	0	0	2<<	0	0	0	0	0	0	0
	. 0	0	0	0	0	0	0	0	0	0	2<<	0	0	0
	. 0	32	0	0	0	0	0	0	0	0	0	0	0	32
	. 0	23<<	0	0	0	0	0	0	0	0	0	0	0	2<<
550.00	. 25	12	0	50	0	50	34	34	50	23	34	23	50	12
	. 16<<	0	0	10<<	0	9<<	0	0	0	1<<	8<<	0	3<<	0
	. 0	0	0	0	0	0	2<<	0	0	0	0	0	0	0
	. 0	0	0	0	0	0	0	0	0	0	0	0	0	0
	. 0	29	0	0	0	0	0	0	0	0	0	0	0	29
	. 0	25<<	0	0	0	0	0	0	0	0	0	0	0	2<<

Figure 45 . LINK Summary Table for RUN #4 (con't)

600.00	22	13	0	50	0	50	37	32	50	26	32	26	50	13
	14<<	1<<	0	10<<	0	9<<	0	0	0	1<<	7<<	0	4<<	0
	0	0	0	0	0	0	2<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	28	0	0	0	0	0	0	0	0	0	0	0	28
	0	24<<	0	0	0	0	0	0	0	0	0	0	0	2<<
660.00	23	10	0	50	0	50	33	33	50	25	33	25	50	10
	15<<	0	0	10<<	0	10<<	0	0	0	1<<	6<<	0	1<<	0
	0	0	0	0	0	0	2<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	0	28	0	0	0	0	0	0	0	0	0	0	0	28
	0	24<<	0	0	0	0	0	0	0	0	0	0	0	2<<
730.00	20	13	0	50	0	50	32	32	50	28	32	28	50	13
	13<<	2<<	0	9<<	0	10<<	1<<	0	0	2<<	5<<	0	0	0
	0	0	0	0	0	0	3<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	3<<	0	0	0
	0	23	0	0	0	0	0	0	0	0	0	0	0	23
	0	24<<	0	0	0	0	0	0	0	0	0	0	0	2<<
780.00	17	14	0	50	0	50	32	32	50	31	32	31	50	14
	11<<	1<<	0	9<<	0	10<<	0	0	0	3<<	7<<	0	3<<	0
	0	0	0	0	0	0	3<<	0	0	0	0	0		0
	0	0	0	0	0	0	0	0	0	0	1<<	0	.	0
	0	19	0	0	0	0	0	0	0	0	0	0	0	19
	0	21<<	0	0	0	0	0	0	0	0	0	0	0	2<<
840.00	18	13	0	50	0	50	31	31	50	30	31	30	50	13
	10<<	1<<	0	9<<	0	10<<	0	0	0	2<<	6<<	0	4<<	0
	0	0	0	0	0	0	3<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	0	20	0	0	0	0	0	0	0	0	0	0	0	20
	0	20<<	0	0	0	0	0	0	0	0	0	0	0	2<<
910.00	21	13	0	50	0	50	29	29	50	27	29	27	50	13
	12<<	2<<	0	9<<	0	10<<	0	0	0	3<<	6<<	0	2<<	0
	0	0	0	0	0	0	2<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	3<<	0	0	0
	0	19	0	0	0	0	0	0	0	0	0	0	0	19
	0	19<<	0	0	0	0	0	0	0	0	0	0	0	2<<
960.00	20	10	0	50	0	50	32	32	50	28	32	28	50	10
	10<<	2<<	0	10<<	0	10<<	0	0	0	3<<	5<<	0	2<<	0
	0	0	0	0	0	0	3<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	0	20	0	0	0	0	0	0	0	0	0	0	0	20
	0	19<<	0	0	0	0	0	0	0	0	0	0	0	2<<
1020.00	19	13	0	50	0	50	31	31	50	29	31	29	50	13
	10<<	2<<	0	10<<	0	9<<	0	0	0	4<<	5<<	0	3<<	0
	0	0	0	0	0	0	4<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	2<<	0	0	0
	0	20	0	0	0	0	0	0	0	0	0	0	0	20
	0	19<<	0	0	0	0	0	0	0	0	0	0	0	2<<
1090.00	20	12	0	50	0	50	33	33	50	28	33	28	50	12
	10<<	0	0	10<<	0	10<<	0	0	0	3<<	5<<	0	5<<	0
	0	0	0	0	0	0	4<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	0	23	0	0	0	0	0	0	0	0	0	0	0	23
	0	21<<	0	0	0	0	0	0	0	0	0	0	0	2<<

Figure 45. LINK Summary Table for RUN #4 (con't)

1140.00	.	20	10	0	50	0	50	32	32	50	28	32	28	50	10
	.	11<<	0	0	10<<	0	10<<	0	0	0	3<<	5<<	0	3<<	0
	.	0	0	0	0	0	0	4<<	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	.	0	23	0	0	0	0	0	0	0	0	0	0	0	23
	.	0	21<<	0	0	0	0	0	0	0	0	0	0	0	2<<
1200.00	.	18	11	0	50	0	50	30	30	50	30	30	30	50	11
	.	10<<	0	0	10<<	0	10<<	0	0	0	3<<	4<<	0	3<<	0
	.	0	0	0	0	0	0	4<<	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	2<<	0	0	0
	.	0	17	0	0	0	0	0	0	0	0	0	0	0	17
	.	0	16<<	0	0	0	0	0	0	0	0	0	0	0	2<<
1270.00	.	16	10	0	50	0	50	31	31	50	32	31	32	50	10
	.	9<<	0	0	10<<	0	10<<	0	0	0	3<<	4<<	0	4<<	0
	.	0	0	0	0	0	0	3<<	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	.	0	9	0	0	0	0	0	0	0	0	0	0	0	9
	.	0	16<<	0	0	0	0	0	0	0	0	0	0	0	2<<
1320.00	.	15	9	0	50	0	50	29	29	50	33	29	33	50	9
	.	8<<	0	0	10<<	0	10<<	0	0	0	4<<	2<<	0	4<<	0
	.	0	0	0	0	0	0	3<<	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	.	0	9	0	0	0	0	0	0	0	0	0	0	0	9
	.	0	13<<	0	0	0	0	0	0	0	0	0	0	0	2<<
1380.00	.	15	9	0	50	0	50	29	29	50	33	29	33	50	9
	.	7<<	1<<	0	10<<	0	10<<	0	0	0	3<<	2<<	0	4<<	0
	.	0	0	0	0	0	0	3<<	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	.	0	10	0	0	0	0	0	0	0	0	0	0	0	10
	.	0	15<<	0	0	0	0	0	0	0	0	0	0	0	2<<
1440.00	.	13	10	0	50	0	50	29	29	50	35	29	35	50	10
	.	6<<	1<<	0	10<<	0	11<<	0	0	0	2<<	1<<	0	6<<	0
	.	0	0	0	0	0	0	3<<	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	.	0	9	0	0	0	0	0	0	0	0	0	0	0	9
	.	0	16<<	0	0	0	0	0	0	0	0	0	0	0	2<<

Figure 45. LINK Summary Table for RUN #4 (con't)

is used more often. Notice that, as expected, the R/T OP job also appears, as the weakest link in 2 replications. Since the R/T OP link was an essential node in the available chain, and since the R/T OP (person) was a total casualty in 2 replications, the cause of the 2 zero-effectiveness replications in the frequency of results table is now clear. However, looking down to time 61., one sees that the R/T OP link is no longer weakest in any replications. Apparently, in those replications in which it was weakest, some substitute was made. Recalling the (input) substitution table, a number of substitutes are possible: however, all require at least 15 minutes to substitute. Therefore, such substitution was not done by time 11. (The actual substitutions made, of course, are available in the intermediate results by turning RECONSTITUTION on in the OUTPUT.)

Numerous other results are available to study the interaction of various combinations of losses, the ramifications of reallocation decisions, etc. However, it is beyond the scope of this report to detail the importance of every example number. For now, we content ourselves to point out one new occurrence. At time 310., and at intermittent times thereafter, the CRANE OP link shows replications in which it was weak due to limitations in the number allowed in the link. Recall that, in the description of the CRANE OP job, it was stipulated that there could only be one operator per crane. (CRANE was identified as an associated link for CRANE OP.) In this run, replications occur in which the crane team leg of the loading capability is limited by the need to put a less-than-100 percent-effective substitute into the CRANE OP job. Other equal or less effective substitutes were also available; however, the stipulation of one per crane limited further assignment of assets to that limiting link.

The final output tables summarize the results of RUN #4 in terms of the operant chain. The end-of-encounter summaries reveal some interesting interactions between failure, repairs, and lethality. Recall that RUN #3 inputs specified a preponderance of light failures for FKLFTs and CRANEs. However, the lethality data in RUN #4 for those items favored medium damage. As a result, although the failure data was unchanged, the repair load shifted from a predominantly light repair to an approximately even distribution of work. Total failures decreased by 20 to 30 percent, since combat damaged equipment is out of action. Number of repairs completed, (and total number of parts used) was virtually unchanged between RUNs #3 and #4: this resulted from the fact that capability to do repairs-in particular, capability to staff the REPAIR link-was a predominately weak link, as recorded in the LINK RESULTS table.

The complete output of RUN #4 can be found in Appendix E.

G. Stochastic Lethality

In AURA's normal mode, lethality is compiled deterministically: that is, a probability of loss is equated to a fractional loss. Thus, if the lethality routines indicated that a truck has a 0.4 chance of surviving a particular warhead detonation, the code considers 0.4 trucks as remaining. In fact, however, there should be one, or no, trucks

surviving in any one replication, with the latter 1.5 times more probable than the former.

AURA allows the user a stochastic alternative to the deterministic lethality. There is no difference in the lethality routines or data. However, by specifying STOCHASTIC, ON under the MODE mnemonic, the user causes AURA to use a Monte Carlo technique, drawing random numbers against the calculated kill probabilities. These draws determine specific, total casualties and survivors for each event. The code then proceeds exactly as before, using the surviving assets in the same optimum allocation routines, repair routines, etc. While the stochastic model is, in many ways, intuitively more realistic than the deterministic model, the use of additional Monte Carlo processes requires, in general, many more replications to generate a statistically valid sample of results. For that reason, AURA has historically been run in a hybrid mode: stochastic modeling was used for the highly singular effects of warhead delivery and deterministic modeling used for the lethality thereof. However, certain studies, in which specific instances of survivors/casualties are crucial, may require the totally stochastic approach. To demonstrate the effect of stochastic lethality, RUN #4 was repeated, changing only the MODE to STOCHASTIC LETHALITY, ON. The results are shown in Figure 46. Most striking is the similarity in averaged results. Final averaged effectiveness, for 50-replication runs, differ by approximately 3 percent. Similarly, average asset survivors differ in the order of 0.02. Striking differences are seen, however, in the occurrences in specific replications. For example, the frequency distribution of results shows several more 0. effectiveness results, as expected. Similarly, differences are seen in the LINK RESULTS table. However, the smoothing effect of looking at an entire unit, plus the averaging over a large number of replications, leads one to conclude that the final, average unit effectiveness is sufficiently well modeled by the deterministic technique for this example unit.

IX. MULTIPLE MISSIONS

In this excursion, the execution of a competing (non-preferred) mission and a time-sequenced alternate mission are demonstrated. The mission to compete with loading a truck is to take an order on the radio and relay it on the telephone. The LOADMSTR or R/T OP can do this job; however, this mission is a last resort and is arbitrarily valued at 0.3. The sequential mission is to move the unit. For this purpose, a TRUCK, a LOWBOY, DRVR1, DRVR2, and a RADIO are required links.

A. A "Dummy" Link

It is often convenient, especially in cases involving secondary missions, to allow inclusion of tasks other than those done in the standard procedure for accomplishing the initial mission. Such unstaffed tasks have historically been called dummy links. An example of this, the HANDLOAD alternative to using the FKLFT, was briefly discussed in Section II A. To specify a "dummy link," the user need only 1) give the task a unique name, 2) deploy the link as though it were a person or piece of equipment, and 3) include it as any other link in the link

EFFECTIVENESS VS. TIME ***
****

TIME	EFFECTIVENESS	100	90-99	80-89	70-79	60-69	50-59	40-49	30-39	20-29	10-19	1-9	0
0.00	1.00 +/- .000	50	0	0	0	0	0	0	0	0	0	0	0
11.00	.75 +/- .055	33	0	0	3	1	2	2	0	0	0	0	9
61.00	.76 +/- .052	30	0	0	9	1	0	2	0	0	0	0	8
121.00	.75 +/- .051	27	0	0	12	1	0	2	0	0	0	0	8
190.00	.72 +/- .050	23	0	0	15	1	1	2	0	0	0	0	8
240.00	.71 +/- .050	21	0	0	17	2	0	2	0	0	0	0	8
310.00	.57 +/- .056	15	0	0	12	1	2	6	0	0	0	0	14
370.00	.60 +/- .055	16	0	0	13	1	2	6	0	0	0	0	12
420.00	.60 +/- .055	16	0	0	13	2	1	6	0	0	0	0	12
480.00	.60 +/- .054	15	0	0	13	4	0	6	0	0	0	0	12
550.00	.60 +/- .054	15	0	0	13	3	2	5	0	0	0	0	12
600.00	.59 +/- .054	14	0	0	14	3	2	5	0	0	0	0	12
660.00	.60 +/- .055	16	0	0	11	5	1	5	0	0	0	0	12
730.00	.60 +/- .055	16	0	0	12	4	1	5	0	0	0	0	12
780.00	.59 +/- .053	14	0	0	15	3	2	4	0	0	0	0	12
840.00	.59 +/- .054	16	0	0	9	4	2	7	0	0	0	0	12
910.00	.57 +/- .053	14	0	0	9	5	5	5	0	0	0	0	12
960.00	.58 +/- .052	13	0	0	11	7	3	4	0	0	0	0	12
1020.00	.59 +/- .053	14	0	0	11	6	2	5	0	0	0	0	12
1090.00	.59 +/- .053	14	0	0	12	7	1	4	0	0	0	0	12
1140.00	.60 +/- .054	15	0	0	12	6	1	4	0	0	0	0	12
1200.00	.60 +/- .054	16	0	0	11	4	2	5	0	0	0	0	12
1270.00	.58 +/- .053	13	0	0	14	3	2	6	0	0	0	0	12
1320.00	.57 +/- .052	12	0	0	14	4	2	6	0	0	0	0	12
1380.00	.56 +/- .051	11	0	0	13	5	2	7	0	0	0	0	12
1440.00	.56 +/- .051	10	0	0	15	4	4	5	0	0	0	0	12

Figure 46. Effectiveness vs Time Data for RUN #4 with Stochastic Lethality

definition input (after the LINKS mnemonic). In defining the dummy link, those assets which could perform the task, if necessary, are identified as substitutes.

For this excursion, a number of dummy links is introduced. These are listed in Table 4. The LINKS input is shown in Figure 47. Note, particularly, the RELAY link. Since the chain to describe the relay mission will be a simple string of ANDs, that mission will never be evaluated higher than its least effective link. Limiting the RELAY link to a maximum effectiveness of 0.3 therefore limits the relay mission as a whole to a maximum of 0.3. Preference is thus assured for the original loading mission unless it is degraded below 0.3.

TABLE 4. DUMMY LINKS FOR RUN #48

LINK NAME	NO. REQUIRED	MAX EFF	SUBSTITUTES
RELAY	1.	30	LOADMSTR, R/T OP
DRVR1	1.	(100)	PERSONNEL
DRVR2	1.	(100)	PERSONNEL

```
LINKS
DRIVER, 1., 1.
$A, TRUCK
$PERSONNEL
$T,15.
$E,.85
RADIO,1.0
TELE,1.0
TRUCK,1.0
CRANE OP,1.0,1.0
$A,CRANE
$FKLFT OP, RIGGER, LOADMSTR
$T, 10., 5., 5.
$E, 0.8, 0.5, 1.0
RIGGER, 1.0
$PERSONNEL
$T, 5.
$E, 0.6
R/T OP, 1.0, 1.0
$LOADMSTR,PERSONNEL
$T,20.,15.
$E, 1.0, 0.8
FKLFT, 1.0
CRANE, 1.0
FKLFT OP, 1.0, 1.0
$A, FKLFT
$CRANE OP, LOADMSTR, PERSONNEL
$E,0.9, 1.0, 0.2
$T, 10., 5., 5.
LOADMSTR, 1., 2.
$M,75
HANDLOAD, 5.0, 65
$M,1.0
$PERSONNEL
$E,1.
$T,5.
PARTS,1.0
REPAIR,2.0
$LOADMSTR,CRANE OP,FKLFT OP
$T,15.,15.,10.
$E,1.,1.,1.
RPR ABILITY,1.
LOWBOY,1.
DRVR1,1.
$PERSONNEL
$E,1.
$T,10.
DRVR2,1.
$PERSONNEL
$E,1.
$T,10.
RELAY,1.,30,1.
$R/T OP,LOADMSTR
$E,1.,1.
$T,0.,10.
END
```

Figure 47. LINKS Input for RUN #4B

B. Chains for RUN #4B

Besides the original chain described in Section II.I, two other chains were added for this excursion. The input stream for chains is shown in Figure 48. Notice the insertion of lines beginning with $T, signifying time intervals during which each chain is operant. The format for the $T card is:

$T,start time 1,stop time 1,start time 2,...

Thus, Figure 48 specifies that chains 1 and 2 are operant from start until 540. and from 900. until infinity; chain 3 (the move chain) operates from 540. until 900.

To demonstrate the flexibility in structure of AURA, a further, subtle complication was added to RUN #3B: during the move, all repair activity must stop. There are several ways to cause this to happen. The way chosen here consists of creating (via the REPERTOIRE) an imaginary asset which we call RPR ABILITY, along with a corresponding, simple link. One unit of RPR ABILITY is deployed. (To avoid calculating weapon effects against RPR ABILITY, the deployment point was chosen at infinity. The alternate name satisfies checks for the existence of lethality data.) Therefore, the RPR ABILITY link, which was added to the repair subchain (*3), can be satisfied at time 0. An external loss event, inserted through the LOSSES mnemonic, removes RPR ABILITY at move time (540.), making repair impossible. After the move (time 900.), RPR ABILITY is again inserted using the REINFORCEMENTS mnemonic.

The resulting effectivenesses from RUNs #4 and 4B are plotted in Figure 49. Except for the move mission time interval (540. to 900.), the two are nearly identical. The reason is that the primary (LOADING) mission effectiveness, in RUN #4, seldom fell below 0.3. Therefore, the competing (RELAY) mission was only chosen in approximately 7 replications. (The precise number of uses for each chain, as read from the CHAIN RESULTS on TIME output, varies for different reconstitution times.) Furthermore, since the RELAY chain was limited to an effectiveness of 0.3 and used some of the same assets as did the LOADING chain, there was usually little advantage gained when the RELAY chain was chosen. It was therefore decided to repeat RUN #4B with a 0.6 maximum effectiveness for the RELAY link and chain. The results from that excursion are also plotted, as RUN #4B (60 percent), in Figure 49. As expected, the presence of an alternative generally improves the result. However, since the no-alternative average is near 0.6, the presence of an alternative with a maximum effectiveness of 0.6 has a limited effect on the overall average.

Not shown in Figure 49 is the effect of discontinuing repairs during the move mission. Since repairs were generally going on throughout the entire encounter, one would expect the effect of curtailing repair operations to be proportional to the fraction of time lost. In fact, the decrease from 1.53 to 0.99 reported in the full output (not included in this report) represents a decrease of 35 percent, quite in line with the 31 percent decrease in repair time available.

```
CHAINS
P/T OP, +1, !LOADING TECHNIQUE, TRUCK, LOADNSTP
$T,0.,540.,900.,1.F35
RELAY,RADIO,TELE
$T,0.,540.,900.,1.F35
DRVR1,DRVR2,RADIO,P/T OP,TRUCK,LOADBOY
$T,540.,900.
END
```

Figure 48. CHAINS Input Stream for RUN #4B

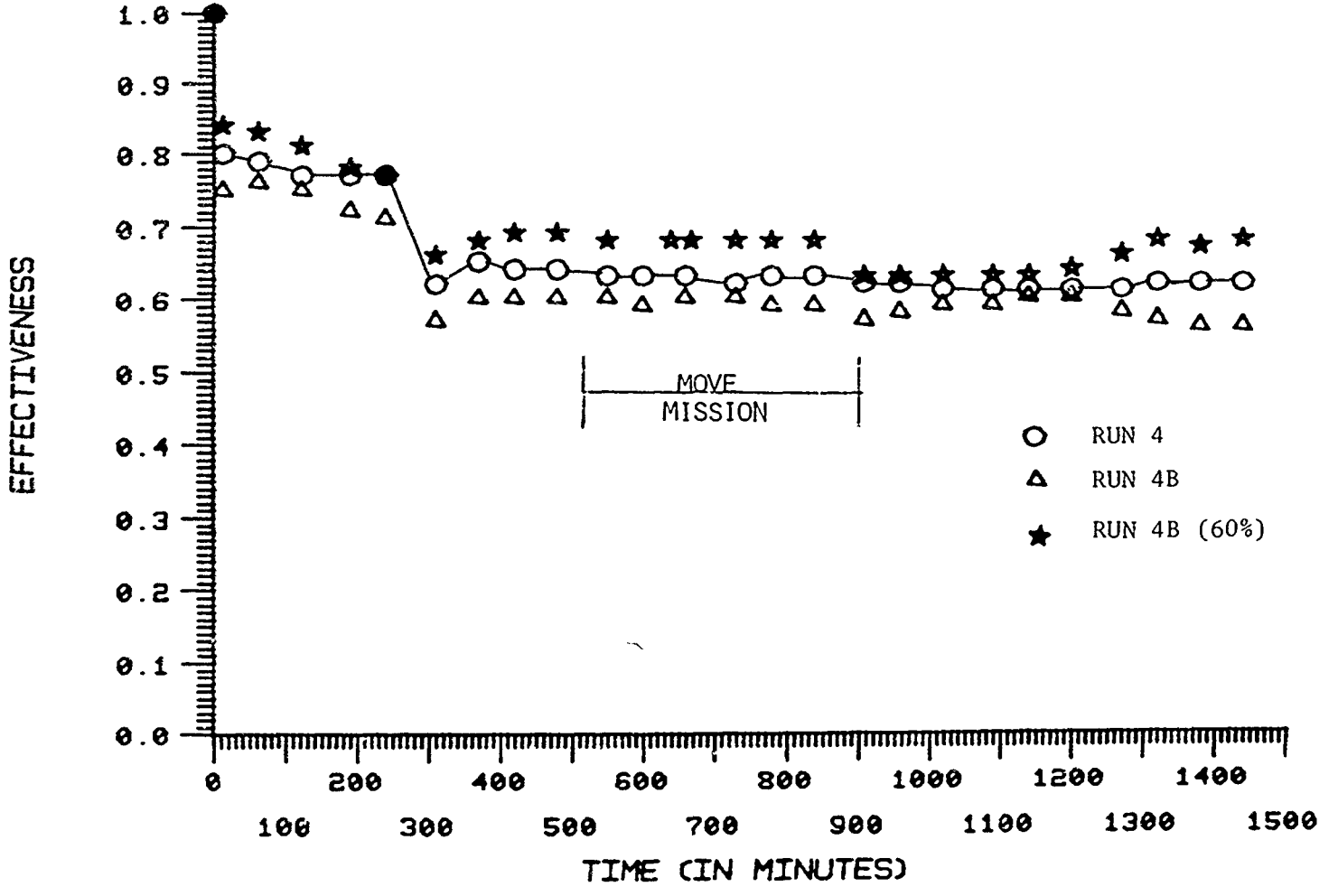

Figure 49. Graphic Comparison of Effectiveness Results for Runs #4, #4B, and #4B (60%)

Many other excursions could be run to test the interaction of weapon effects and employment, unit capability and deployment, mission requirements, etc.

X. SUMMARY TO VOLUME I

This volume has attempted to introduce the reader to the analysis of an Army unit via the AURA family of methodologies. The approach taken was to progress in complexity from a simple, non-combat scenario to a fairly complete, multi-mission conventional attack. Throughout the report, a simple, hypothetical supply unit was used as the working example. Run #1 involved the basic set-up and description of the unit. Run #2 added equipment failures. In Run #3, unit capability was expanded to include the ability to divert assets to conduct repairs on its own failed equipment. In Section VIII, the fourth series of runs introduced indirect fire attacks against the unit. That section presented both those factors which pertain to the delivery of indirect fire munitions in general and the calculation of the effects of conventional (fragmenting) munitions in particular. Finally, a run (#4B) was done in which the unit conducted one of two missions during certain time intervals (commander selected most effective choice) and conducted a third mission between those intervals, all of which occurred in a conventional, indirect fire scenario.

In the next volume of this user's introduction, the weapon effects will be extended to include those from nuclear and chemical warheads. Special topics, such as the modeling of degraded individuals will be included.

A third volume is tentatively being planned. In that volume, the conduct of an AURA analysis - from data preparation through analysis of outputs and investigation of results' sensitivities - will be presented from an analyst's perspective.

During the writing of this report, it became evident that this work would not fulfill the need for a concise manual to help the knowledgeable user run the code. The computer-resident RCCINFO file, presented in APPENDIX A, is felt to be too concise for this need. Therefore, a fourth publication, an AURA User's Manual, will be written, possibly in conjunction with user's guides to the growing number of utility programs which interactively aid the user in preparation of AURA inputs.

REFERENCES

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2. J.T. Klopcic, et al, "RCC: A Methodology/Code to Model Residual Combat Capability at the Unit Level," Addendum to Reference 1, US Army Ballistic Research Laboratory, Technical Report No. ARBRL-TR-02196, September 1979, (UNCLASSIFIED), AD B042085L.

3. J.T. Klopcic and M.A. McDonald, "RCC Methodology/Code Extensions (JUL 80): Failure Model, Repair/Return, Augmented I/O and Division-Level Interfacing," US Army Ballistic Research Laboratory, Technical Report No. ARBRL-TR-02275, December 1980, (UNCLASSIFIED), AD A095346.

4. J.T. Klopcic and J.J. Baldauf, "The BRL Chemical Protection Degradation Model: The Degraded Effectiveness Algorithm, Degradation Matrix, and 'MOPPDAT' Individual Performance Database," US Army Ballistic Research Laboratory, Draft Report, (UNCLASSIFIED).

5. J.T. Klopcic and J.C. Maloney, "New Nuclear Vulnerability Database, Input Format and Supporting Software for RCC," US Army Ballistic Research Laboratory, Memorandum Report No. ARBRL-MR-03001, March 1980, (UNCLASSIFIED), AD A084982.

6. JTCG/ME, "Simplified Weapons Evaluation (QUICKIE) Computer Program," 61 JTCG/ME-77-1, 25 February 1977.

APPENDIX A

RCCINFO

INPUT INFO FOR AURA
****
****

UPDATED - < 27 JUN 84 >

PROGRAM BEGINS BY READING, FROM INPUT, NAME OF FILE CONTAINING RUNSTREAM

THE USER MAY INSERT A MESSAGE CARD, TO BE WRITTEN ATOP OUTPUT, AFTER INPUT FILE CARD

FOLLOWING MESSAGE, USER MAY INPUT OFFSET(X,Y) (CARD CONTAINING 2 F.P. NUMBERS)
(SEE OFFSET OPTION UNDER ENCOUNTER INPUTS, BELOW)

THE FOLLOWING DESCRIBES THE FORMAT OF DATA IN THE RUNSTREAM

GENERAL COMMENTS
.....

RCC INPUTS ARE ALL MNEMONIC AND FREE-FIELD (AND MACHINE INDEPENDENT, ALMOST). THREE FORMS OF INPUT ARE SOLICITED
ALL HOLLERITH, ONE HOLLERITH NAME (TWO WORDS) FOLLOWED BY NUMBERS (FIXED AND F.P., MIXED), AND ALL NUMBERS.
HOLLERITH STRINGS ARE SEPARARTED BY COMMAS. NUMBERS BY COMMAS OR SPACES. LEADING BLANKS ARE IGNORED.
THE GENERAL FORM OF A RUNSTREAM IS AS FOLLOWS
REPERTOIRE: ALL NAMES TO BE USED FOR FUNCTIONAL GROUPS AND WEAPONS
END
ENCOUNTER1 INPUTS: ALL OTHER DATA, INCLUDING PROGRAM CONTROLS, FOR THE ENCOUNTER. STANDARD FORM IS:
MNEMONIC - TO INDICATE TYPE OF DATA
DATA
END
(NOTE, HOWEVER, THAT RCC TRIES VERY HARD TO COMPENSATE FOR MISSING END CARDS. AT PRESENT, ONLY THE END
CARD AFTER THE REPERTOIRE IS ESSENTIAL)
AFTER THE DATA IS IN:
GO THE PROGRAM EXECUTES ONE ENCOUNTER AND RETURNS FOR NEW ENCOUNTER INPUTS
STOP ENDS PROGRAM
SPECIAL FEATURE: A CARD BEGINNING WITH A DOLLAR SIGN, $, IS INTERPRETED AS A CONTINUATION OF THE PRECEDING CARD.
HOWEVER, CERTAIN INPUTS MAY ALLOW OPTIONAL DATA TO BE INSERTED ON CARDS WHICH BEGIN WITH A $
THESE INPUTS ARE IDENTIFIED IN THE FOLLOWING PAGES. IF OPTIONAL DATA CAN BE INPUT ON A FOLLOWING $ CARD,
NO CONTINUATION OF THE PRECEDING CARD IS POSSIBLE.
ANY CARD WHICH BEGINS WITH A TIC-TAC-TOE SIGN, #, IS ASSUMED TO BE A COMMENT CARD, AND IS IGNORED.
COMMENTS CAN ALSO BE INSERTED ON ANY CARD AFTER THE CARD'S DATA BY USING A #. ANY # AFTER COLUMN ONE ENDS SCAN OF THAT CARD

NAMES OF WEAPONS AND FUNCTIONAL GROUPS MAY BE 13 CHARACTERS LONG (OR LESS).
ANY STRING OF 18 BLANKS STOPS THE SCAN OF A CARD.

** ANY ITEM IN SQUARE BRACKETS [ ] IS NOT ESSENTIAL TO THE INPUT FORMAT, BUT CONVEYS ADDED
INFORMATION. NESTED BRACKETS INDICATE OPTIONS W/IN OPTIONS. PARENTHESES ( ) ENCLOSE COMMENTS FOR THIS LISTING **
** IN THIS DOCUMENT, A QUOTE SIGN, ', IS USED TO INDICATE INPUTS THAT MUST APPEAR EXACTLY AS DELINEATED.
THE USER NEVER INPUTS QUOTE SIGNS . **

** ANGULAR BRACKETS ARE USED TO INDICATE MAXIMUM NUMBER OF ITEMS OR CONSTRUCTS ALLOWED.
NOTE, HOWEVER, THAT THE DIMENSIONS OF AURA ARE PARAMETERS WHICH CAN BE RESET BY THE USER AT COMPILATION TIME.
THEREFORE, THE < > NUMBERS REFER ONLY TO THE VALUES IN THE BRL VERSION OF AURA AS OF THIS UPDATE **

** SOME GENERAL MAXIMA APPLY ACROSS SEVERAL INPUTS:
< MAX. NO. OF EVENTS OF ANY KIND: 300 EVENTS >
< MAX. NO. OF RECONSTITUTION EVENTS, INCLUDING INITIAL RECONSTITUTION (INSERTED BY CODE): 48 >

```
C
C     THE FOLLOWING FILES (UNITS) ARE USED FOR I/O IN AURA:
C
C     UNIT NO.    USAGE
C     ....................................
C     1           SAVES WARNING MESSAGES FOR REPEAT AT END OF RUN
C     2           INPUTS CONVENTIONAL LETHALITY DATA
C     3           INPUTS NUCLEAR VULNERABILITY DATA
C     4           INPUTS CHEMICAL DISSEMINATION DATA
C     5           INPUTS RUNSTREAM DIRECTIVES AND ASSOCIATED DATA
C     6           NORMAL OUTPUT
C     7           REPLACES 6 IF "PRINT7" IS ON (UNDER "OUTPUT" MNEMONIC)
C     8           HOLDS INTERMEDIATE RESULTS IF "DUMP8" IS ON
C     9           HOLDS ACTUAL WEAPON BURSTS FOR GRAPHICS POSTPROCESSOR
C                 IF "DUMP9" IS ON
C     10          CONTAINS ETI/PCI RESULTS IF "TIPCI" IS ON
C     11          INPUTS SUB-IMMEDIATELY-LETHAL NUCLEAR DOSE DEGRADATION
C     12          SCRATCH UNIT (USED IN CHNPLT,E.G.)
C
C
```

REPERTOIRE INPUT
****

FORMAT
......

```
WEAPON
WEAPON NAME1 [, ALT. NAME, ALT. NAME, .... ]  < MAX: 93 WEAPONS, 293 TOTAL NAMES >
WEAPON NAME2 [, ALT. NAME, ALT. NAME, .... ]
WEAPON NAME3 [, ALT. NAME, ALT. NAME, .... ]
.............
FUNCTIONAL GROUP   ( OR ASSET OR ASSETS )
FUNCTIONAL GROUP NAME1 [, ALT. NAME, ALT. NAME, .... ]  < MAX: 151 ASSETS, 453 TOTAL NAMES >
FUNCTIONAL GROUP NAME2 [, ALT. NAME, ALT. NAME, .... ]
FUNCTIONAL GROUP NAME3 [, ALT. NAME, ALT. NAME, .... ]
.........
END
```

COMMENTS ON REPERTOIRE INPUT
....

1. SOME NAMES MAY BE COMMON TO SEVERAL ASSETS OR WEAPONS. THIS ALLOWS SUBSCRIBING A COMMON CHARACTERISTIC TO SEVERAL ITEMS BY ATTACHING THE CHARACTERISTIC TO THE COMMON NAME.
2. ASSET OR WEAPON NAMES MAY BE INPUT IN ANY ORDER, OR MIXED, AS LONG AS AN ASSET OR WEAPON CARD PRECEDES THE NAMES.
3. FOR SECONDARY EXPLOSION, ASSOCIATE EXPLOSIVE WITH TARGET. EXPLOSIVE MUST APPEAR IN BOTH TARGET AND WEAPON REPERTOIRE LISTS.
4. THE NAME 'PERSONNEL' MUST BE ONE OF THE ALT. NAMES FOR ALL PERSONNEL IF TOXIC OR NUCLEAR ARE BEING PLAYED
5. TOXIC WEAPONS SHOULD HAVE ALT. NAME 'TOXIC' OR 'CHEMICAL'. SIM., NUCLEAR WEAPONS SHOULD HAVE 'NUCLEAR' OR 'NUKE'

ENCOUNTER INPUTS
****

FORMAT
......

NOTE: TIMES ARE IDENTIFIED AS ENCOUNTER TIME (CLOCK) OR TIME INTERVALS (INTRVL) - USED TO INPUT A PERIOD OF TIME AFTER AN EVENT

```
MNEMONIC                SUBSEQUENT DATA CARDS
.....................................................................................................................
```

UNIT INPUTS
....

```
ALARM                   ASSET NAME OF ALARM  < MAX: 5 ASSETS >
                        WEAPON NAME, THRESHOLD DOSAGE FOR ALARM TO SOUND
```

```
                    "     "     "     "     "     "     "
                   ETC.
                   NEXT ALARM
                   ETC.
                   ********  NOTE:  MUST READ IN TOXIC DISSEMINATION DATA FIRST, SO CODE CAN ADJUST FOR DOSE NORMALIZATION ********
                   ALARMS ARE DEPLOYED BY ASSET NAME LIKE ANY OTHER EQUIPMENT
                   *** NOTE: ALARMS WILL HAVE NO EFFECT ( WILL BE TOO LATE ) IF PERSONNEL BEGIN TO MOPP-UP
                             AS SOON AS ROUND ARRIVES. ( SEE 'MOPP' DIRECTIVE ( 'ROUND YES' OPTION ) BELOW )
CHAINS             LINKS, IRLINKS, AND/OR SUBCHAINS - ( HOLLERITH ) NAMES IN EACH CHAIN  < MAX: 5 CHAINS >
                   OPTION: CHAINS MAY BE "TURNED OFF AND ON" WITH TIME TO PLAY MISSION CHANGES WITH TIME
                           TO DO THIS, FOLLOW EACH CHAIN CARD(S) WITH
                   'STIMES(I),' S1, T1, S2, T2, .....
                           WHERE S(I) ARE THE (REAL) START TIMES FOR THE MISSION AND T(I) ARE THE CORRESPONDING STOP TIMES
                           SEVERAL MISSIONS MAY PLAY AT ONE TIME, BUT AT LEAST ONE MUST BE OPERANT AT ALL TIMES
                           DEFAULT : S1 = 0., T1 = 1.E35 ( INFINITY )
                   LINKS MUST BE DEFINED PRIOR TO USE IN 'CHAINS' INPUT. SEE LINKS BELOW
                   'CLEAR' WILL CLEAR ALL PREVIOUS CHAINS
COMPOUND LINK      [$]COMPOUND LINK NAME  ( MUST BEGIN WITH ! )  < MAX: 21 COMPOUND LINKS >
                   LINK, ( REAL ) MAXIMUM CONTRIBUTION OF THIS LINK
                   LINK, ( REAL ) MAXIMUM CONTRIBUTION OF THIS LINK
                   .....
CONTAMINATED USAGE ASSET(,CHAIN NUMBERS) - ITEM WHICH COULD BE USED ALTHO CONTAMINATED BY PERSONNEL IN MOPP
                   CHAIN NUMBERS ARE THE NUMBERS, IN ORDER OF INPUT
                   IF CHAIN NUMBERS ARE OMITTED, ITEM IS USABLE IN ALL CHAINS
                   OPTION: IF ASSET IS "ALL", THEN ALL ITEMS ARE USABLE IN CHAINS SPECIFIED
DEGRADATION        MOPP CODE NUMBER ( 0-3 ), TOXIC K.C. (1-20), DEGRADATION FACTOR
DEPLOY             ASSET,X,Y OF TGT PT, [-] NO. THERE, CNV. KILL CRIT., NUC. K.C., TOXIC K.C., POSTURE CODE, NUC COVER CODE, MOPP
                   ( NO. THERE MAY BE REAL OR INTEGER.  NEGATIVE NO. THERE INDICATES A DUMMY TARGET )
                   MOPP ( TOXIC POSTURE ) DEFAULTS TO 0 = NO PROTECTION AND K.C. DEFALTS TO 1. ( MUST SPEC. BOTH OR NEITHER )
                   [ CONTINUATION CARD ($) FOR POSTURE CHANGES.  FORMAT: ]
                        $ NEW CONV. COVER, NEW NUC. COVER, TIME TO CHANGE POSTURE                    OR
                        $ NEW MOPP, TIME TO CHANGE POSTURE                                           OR
                        $ NEW CONV. COVER, NEW NUC. COVER, TIME TO CHANGE POSTURE, NEW MOPP, TIME TO CHANGE POSTURE
                        < MAX: 301 DEPLOYMENT POINTS, WHERE EACH 'ASSET,X,Y,...' LINE DEFINES A POINT >

                   *** NOTE: SEE ALSO OFFSET AND DISCUSSION OF COORDINATES, BELOW ***

                        *** NOTE ON RANGES OF CODE NUMBERS ***
                   *    CONVENTIONAL KILL CRITERIA, POSTURES - UNLIMITED ( SEE CONV. LETH. DATA, BELOW )
                   *    NUCLEAR KILL CRITERIA - ( 1-5 ) . NUCLEAR POSTURES - ( 1-61 )
                   *    TOXIC KILL CRITERIA - ( 1-20 ) . TOXIC POSTURES - ( 0-8 )

EXPENDABLE         ASSET, RATE ( FOR TIME-DEPENDENT EXPENDITURE OF SPECIFIED ASSET )
                   $ASSET ( FOR REPAIR-DEPENDENT EXPENDITURE.  NOTE THE $ MUST BE IN COLUMN 1 )
                         ASSET WILL BE USED UP IN REPAIRS, AS A FUNCTION OF REPAIR COMPLETION
                                        NOTES ON EXPENDIBLES
                                        ----- -- ----------
                   *              ITEMS CAN BE EXPENDED IN TWO WAYS: BY TIME OR BY REPAIRS THAT USE UP THE ITEM:
                   *                      FOR TIME-DEPENDENT EXPENDITURE, THE AMOUNT THAT IS USED UP
                   *              ( SUBTRACTED FROM THE SURVIVING ASSETS DURING UPDATE BEFORE A RECONSTITUTION ) DEPENDS UPON THE
                   *              AMOUNT OF MISSION TIME SPENT SINCE THE PRECEDING UPDATE, AND THE EFFECTIVENESS
                   *              OF THE UNIT DURING THAT MISSION TIME. ( MISSION TIME IS THAT TIME WHICH
                   *              FOLLOWS A RECONSTITUTION AND EXTENDS UNTIL INTERRUPTION BY A LETHALITY EVENT. )
                   *              THE RATIONAL IS THAT A UNIT USUALLY EXPENDS ITEMS WHEN IT IS WORKING,
                   *              AND AT A RATE THAT IS PROPORTIONAL TO THE RATE AT WHICH IT IS WORKING.
                   *              ASSETS WHICH ARE EXPENDED BY TIME NEED ONLY APPEAR AS FUNCTIONAL GROUPS ( IN THE REPERTIRE )
                   *              AND AFTER THE EXPENDABLE MNEMONIC IN THE ASSET, RATE FORMAT.
                   *                      ITEMS WHICH ARE EXPENDED DURING THE REPAIR OF OTHER ITEMS ( SUCH AS PARTS
                   *              USED TO FIX TANKS ) MUST APPEAR AS FUNCTIONAL GROUPS AND ASSOCIATED LINKS. LINK
                   *              IS USED, LIKE NORMAL LINK, IN CHAINS OR IN REPAIR SUBCHAIN.
                   *              FOR REPAIR EXPENDIBLE, RETURN OF X AMOUNT OF REPAIRED
                   *              ITEM USES UP X*NO.-OF-ASSET-FOR-MAX-CAP  EXPENDIBLE ( SEE LINKS, BELOW )
                   *              THEREFORE, A REPAIR-EXPENDIBLE LINK IS PARAMETERIZED FOR ONE REPAIR
```

```
FAILURE RATE        ASSET, MTBF ( MEAN TIME BETWEEN FAILURES )[,FRACTION (REAL) LITE, FRACTION MEDIUM] ( REMAINDER ASSUMED DEAD)
                    ( IF NO FRACTIONS SPECIFIED, ASSUME ALL FAILURES DEAD ). ( PERSONNEL CANNOT BE REPAIRED  DEAD FAILURES ONLY )
                    ["PREFAIL",]N OR OFF]  IF ON , CODE UPDATES JUNKYARD WITH FAILURES AT ONSET OF EACH REPLICATION
                    NUMBER DEPENDS UPON FAILURE AND REPAIR RATES. DEAD FAILURES NOT INCLUDED.  DEFAULT = ON.
                    OPTION: IF MTBF IS .LT. 0, NUMBER IS INTERPRETED AS PROBABILITY OF INITIAL LOSS
                       PRESET OPTION ( MUST BE (LEFT) 'ON' ) IS THEN USED TO TAKE INITIAL CASUALTIES
                       WITH THIS OPTION, DEAD CASUALITIES ARE ALLOWED
FATIGUE             LINK NAME, TIME, NEW CAPLNG, CAPG, MAXEFF
                         CAUSES CREATION OF AN EVENT  < MAX: 47 EVENTS >
                    ( SEE LINKS, BELOW )
GRANULARITY         ASSET, GRNL ( ALLOWS SPECIFYING THE LARGEST AMT. OF ASSETS TO BE SUBSTITUTED IN ANY ONE OPTIMIZATION STEP )
                    ( THIS ALLOWS THE DIVISION OF THE LABOR OF ONE ASSET, SINCE THE OPTIMIZATION WILL "BUILD UP" COMPETING LINKS
                    ONE GRNL AT A TIME )  ( MINIMUM GRN = 0.01 )
LINKS               LINK NAME(=NAME OF HOMELINK ASSET), (REAL) NO.-OF-ASSET-FOR-MAX-CAP. [,MAX. EFF.(%,INTEGER)],[MAX. IN (REAL) ]
                    ( IF NO MAX. EFFECTIVENESS, MAX EFF = 1. )
                    ( MAX IN = MAXIMUM NO. OF ITEMS WHICH CAN PARTICIPATE IN TASK )
                                ( LIMITS NO. OF SUBOPTIMAL SUBSTITUTES.  DEFAULT = UNLIMITED.  SEE SA OPTION, BELOW )
                    [$,'MINIMA]' [,CAPG (REAL)] [,MIN EFF.( %,INTEGER ) ]
                         CAPG IS THE NO. OF ASSETS BELOW WHICH THERE IS NO FURTHER DECREASE ( DEFAULT = 0. )
                         MIN EFF. IS EFFECTIVENESS AT CAPG ( DEFAULT = 0% )
                    [$,'ASSOCIATED LINK]', ASSOC. LINK NAME ]
                         THIS OPTION MAKES MAX. IN ( AS SPEC. ON LINK NAME CARD ) RELATIVE TO SPECIFIED ASSOCIATED LINK
                              ******************************************
                    NOTES ON ASSOCIATED LINK:
                         IF AN ASSOC. LINK IS SPECIFIED, CODE RECALCULATES MAX. ALLOWED BEFORE EACH RECONST.
                         THIS IS DONE BY SUMMING ALL SURVIVORS WHICH CAN POSSIBLY SUB INTO THE ASSOCIATED LINK
                         THIS SUM IS THEN MULTIPLIED BY THE MAX. IN ( REAL ) NUMBER FROM THE LINK NAME CARD
                         THAT PRODUCT BECOMES THE MAXIMUM NO. OF ENTITIES USABLE IN THE LINK
                         WARNING: IF THE ASSOC. LINK MEMBERS ARE VERY VERSATILE, THIS OPTION MAY OVERESTIMATE THE TRUE MAXIMUM
                              ( SINCE ASSOC. LINKS WILL USUALLY BE EQUIP., THIS IS UNLIKELY )
                         USE OF THIS OPTION MAY HIDE WEAKNESS IN THE ASSOC. LINK IF THE NAMED LINK IS ALWAYS WEAKER WHEN LIMITED
                         HOWEVER, THE LINK OUTPUT SEPARATES ASSET UNAVAILABILITY WEAKNESS FROM NUMBMAX. IN LIMITED WEAKNESS
                              ( CLEARLY, THE SOPHISTICATED AURA USER WILL HAVE THE INSIGHT TO BENEFIT FROM THIS OPTION )
                              ******************************************
                    [$,ASSETSUB1,ASSETSUB2,.... ( SUBSTITUTES )]
                    [[$,] 'TIMES]',ST1,ST2,.... ( SUBSTITUTION TIMES(INTRVL) )]
                    [[$,] 'EFFECTIVENESSES]',EF1,EF2,.... ( SUBSTITUTES' RELATIVE EFFECTIVENESS )]
                    ( EACH SUBSTITUTE CARD MUST BE FOLLOWED BY SUBSTITUTION TIME AND EFFECTIVENESS CARDS
                    PRECEEDED BY THE WORDS TIMES] AND EFFECTIVENESSES], RESPECTIVELY )
                    'CLEAR' WILL CLEAR ALL PREVIOUS LINKS
                         < MAX: 24 USER-CREATED LINKS >
LOSSES              ASSET LOST, TIME(CLOCK) OF LOSS, NUMBER ( INTEGER ) OF THEM  < MAX: 47 EVENTS >
OFFSET              OFFSETX, OFFSETY
                    ( ADDS OFFSET TO (X,Y) COORDS OF EACH TARGET POINT )
                    ( ALLOWS EASY RE-USE OF GENERIC DEPLOYMENT (0,0) ON LARGE BATTLEFIELD )
                    ( SEE ALSO ABOVE, OFFSET AS 3RD CARD FROM INPUT )
ORLINKS             #NUMBER( ORLINK NAME MUST BE #NO., NO.=1-23 ), LINKS (AND/OR SUBCHAINS) TO BE OR-ED  < MAX: 23 ORLINKS >
PERSISTENCE         (TOXIC) WEAPON NAME ( CAN BE NON-UNIQUE NAME )
                    ASSET, FRACTION OF NUSSELL-CALCULATED PERSISTENCE TIME PERTAINING TO THIS ASSET
                    ASSET, FRACTION OF NUSSELL-CALCULATED PERSISTENCE TIME PERTAINING TO THIS ASSET
                    ETC.  THEN MAY INPUT ANOTHER WEAPON NAME, FOLLOWED BY ASSET, FRACTION CARDS
                    ALLOWS PERSISTENCE OF CONTAMINATION ON OBJECT TO BE DIFFERENT FROM NUSSELL-ASSUMED SURFACE
                    ***** NOTICE *****  MUST FOLLOW TOXIC DATA CARD(S) ( WHICH READ TOXIC DATA FROM UNIT 4 - SEE BELOW )
REINFORCEMENTS      ASSET REINFORCING, TIME(CLOCK) OF ARRIVAL, NUMBER ( INTEGER ) OF THEM  < MAX: 47 EVENTS >
REPAIR              ASSET TO BE REPAIRED
                    $LINK ( OR $SUBCHAIN ) NEEDED FOR REPAIR, LEVEL, PNLT, MEAN TIME FOR REPAIR, STND. DEV. IN TIME, LOC. ( X,Y )
                    ( PNLT IS LOSS IN % EFFECTIVENESS FOR IMMEDIATE MISSION WHICH WILL BE ACCEPTED
                      IN ORDER TO FIX THIS ASSET, IF IT IS THE WEAKEST LINK )
                    ( CODE USES PNLT TO PRIORITIZE REPAIR LEVELS, HIGHEST PNLT IS HIGHEST )
                    ( LOC. IS LOCATION ( X,Y ) WHERE REPAIR IS DONE )
                    ( NOTE: LETHALITY DATA FOR REPAIRABLE ASSET MUST HAVE EXACTLY 3 KILL CRITERIA, VIZ
                          UNREPAIRABLE, MEDIUM, LITE RESPECTIVELY. SEE CONVENTIONAL LETHALITY, BELOW )
                    ["GENERAL REPAIR" - FOLLOWED BY $LINK, LEVEL OR $SUBCHAIN, LEVEL ]
                         ( LEVEL = 0, 1 OR 2 FOR CONTAMINATION, LIGHT OR MEDIUM DAMAGE, RESPECTIVELY )
```

```
                    ( OPTIONAL. IDENTIFY LINK/SUBCHAIN WHICH IS ACTIVE ON ALL REPAIRS AT THE CORRESPONDING LEVEL )
                    ["MAXIMUM NUMBER", NO. ] MAX. NO. ( .LE. 50 ) REPAIRS THAT CAN BE GOING ON AT ONE TIME. DEFALT: 50
                    ["NO REPAIR", NC1,NC2,... - WHERE THE NC S ARE NUMBERS OF CHAINS WHICH DO NOT ALLOW REPAIR]
                    ( DEFAULT IS TO ALLOW REPAIR. )  ( CHAIN INPUT MUST PRECEDE. )
SECONDARY EXPLOSIVE SECONDARY EXPLOSIVE NAME ( AS IN ASSET AND WEAPON LISTS IN REPERTOIRE ), ASSOCIATED ASSETS  < MAX: 103 ASSETS >
SIGNIFICANCE        FRACTIONAL AMOUNT OF IMPROVEMENT NEEDED BEFORE COMMANDER WILL VIOLATE PRIORITY IN SUBSTITUTION
SUBCHAINS           *NUMBER( SUBCHAIN NAME MUST BE *NO., NO.=1-26 ), LINKS TO BE SUBCHAINED
                        < MAX: 26 SUBCHAINS, 130 TOTAL LINKS INVOLVED >
                                **********
                                NOTES ON UNIT STRUCTURE
                                ----- -- ---- ---------
                    *               BASIC QUANTIFYING UNIT IS A LINK. LINKS MAY STAND ALONE AS
                    *               SEGMENTS OF A CHAIN, OR MAY BE COMBINED INTO SUBCHAINS, ORLINKS, ETC.
                    *               THE HIERARCHY OF FUNCTIONAL ENTITIES IS:
                    *                       CHAINS - COMPOUND LINKS - ORLINKS - SUBCHAINS - LINKS
                    *               EACH ENTITY MAY BE MADE UP OF VARIOUS ENTITIES OF LOWER ORDER
                    *
                                **********
                                NOTES ON COORDINATES
                                ----- -- -----------
                    *               ANY RIGHT-HANDED X-Y SYSTEM MAY BE USED FOR DEPLOYMENT
                    *               EMPLOYMENT AIMPOINT IS INPUT IN TARGET COORDINATES
                    *               TARGET COORDS ARE RELATED TO ( WEAPON ) RANGE AND DEFLECTION
                    *               ( FOR INCOMING FIRE ) THROUGH THE INCOMING FIRE DIRECTION INPUT ANGLE
                    *               THAT ANGLE IS SPECIFIED IN DEGREES FROM THE TARGET +X AXIS.
                    *               THUS, FIRE COMING IN THE DIRECTION OF +X IS 0, +Y IS 90, ETC.
                    *               SIMILARLY, WIND DIRECTION HAS DOWNWIND AND CROSSWIND EXACTLY ANALOGOUS TO RANGE AND DEFLECTION
                    *
                                **********

III                 WEAPON INPUTS
                    ..............

CEP ERROR           WEAPON NAME, [ TIME(CLOCK), ] RANGE ERRORS - INDEP., CORR., DEFLECTION ERRORS - INDEP., CORR., HOB ERROR
                    LIKE DELIVERY ERROR, BELOW, BUT WITH RANGE AND DEFLECTION ERRORS IN CEP INSTEAD OF STND. DEV.
CEP TLE             [ TIME(CLOCK), ] ERRORX AND ERRORY
                    LIKE TLE, BELOW, BUT WITH RANGE AND DEFLECTION ERRORS IN CEP INSTEAD OF STND. DEV.
                        < MAX: 33 TLE CHANGE EVENTS, INCLUDING INITIAL SET >
DELIVERY ERROR      WEAPON NAME, [ TIME(CLOCK), ] RANGE ERRORS - INDEP., CORR., DEFLECTION ERRORS - INDEP., CORR., HOB ERROR

                    ** NOTE: DELIVERY ERRORS ( REAL ) ARE INPUT AS SINGLE AXIS STANDARD DEVIATIONS ( =  SQRTS( VARIANCES ) )
                    **       A NORMAL ( GAUSSIAN ) DISTRIBUTION IS ASSUMED - UNLESS -
                    **       ERRORS ARE INPUT AS NEGATIVE ( REAL ) NUMBERS.
                    **       ANY ERROR VALUE INPUT AS NEGATIVE IS DRAWN FROM A UNIFORM RANDOM DISTRIBUTION WITH RANGE AND DEFLECTION
                    **       NUMBERS INTERPRETED AS LIMITS ( + AND - ) OF THE UNIFORM DISTRIBUTION
                    **       NORMAL AND UNIFORM DISTRIBUTIONS CAN BE MIXED IN ONE DELIVERY ERROR INPUT
                    **       ( E.G. CORRELATED ERRORS COULD BE NORMALLY DISTR., AND INDEP. ERRORS UNIFORMLY )
                    **       THE POS. AND NEG. INPUTS HAVE THE SAME EFFECT WHEN INPUTTING CEP ERRORS OR DELIVERY ( STND DEV ) ERRORS
                    **       NOTICE THAT TLES ARE INPUT WITH THE SAME OPTIONS, FORMATS

                    ** NOTE: IF TIME IS PRESENT, INPUT IS AN EVENT ( CHANGE IN VALUE DURING ENCOUNTER ). ELSE = INITIAL VALUE

INCOMING FIRE       [ TIME(CLOCK), ] ANGLE IN DEGREES ( SEE COORD NOTE ABOVE )
ROUND               WEAPON NAME, TIME(CLOCK), DGZ X, Y, Z
TLE                 [ TIME(CLOCK), ] ERRORY AND ERRORY ( REAL )
                    IF VALUES ARE POSITIVE, ERRORS ARE PICKED FROM NORMAL DISTRIBUTIONS WITH ERRORX AND ERRORY AS STND. DEVS.
                    IF NEGATIVE, ERRORS ARE PICKED FROM UNIFORM RANDOM DISTRIBUTION WITH ERRORX, ERRORY AS + AND - EXTREMA
                    SEE NOTES UNDER DELIVERY ERRORS, ABOVE
                        < MAX: 33 TLE CHANGE EVENTS, INCLUDING INITIAL SET >
VOLLEY              WPN NAME, TIME(CLOCK), PATTERN MIDPT - X, Y, Z, NO. RNDS, DIRECTION OF PATTERN - DEG., LENGTH OF PATTERN
                    [ $ , NO. OF ADDITIONAL VOLLEYS, TIME(INTRVL) BETWEEN VOLLEYS, DIRECTION OF MOVE OF MIDPT., DISTANCE OF MOVE ]
                        ( THIS ALLOWS INPUT OF A MOVING BARRAGE )
                     NOTE:  DIRECTION OF MOVE IS MEASURED CCW FROM +X IN TARGET COORD. SYS. ( SEE NOTES, ABOVE )
```

```
                        DIRECTION OF THE PATTERN ( DEGREES ) IS MEASURED FROM THE INCOMING FIRE DIRECTION ( THE RANGE AXIS )
WIND DIRECTION          [ TIME(CLOCK), ] ANGLE IN DEGREES ( SEE COORD NOTE ABOVE )


                        LETHALITY INPUTS
                        ................

CONVENTIONAL            ( NO DATA FOLLOWS IN RUNSTREAM - DATA READ FROM UNIT 2 ( SEE CONVENTIONAL DATA, BELOW ) )
DOSE PARAMETERS         MIN DOSE, VALUE ( MINIMUM DOSE TO BE PROCESSED FOR ETI, RAD DEATH )
                        MAX DOSE, VALUE ( DOSE ABOVE WHICH DEATH IS INSTANTANEOUS )
                        DOSE BINS, BIN1,BIN2,BIN3,BIN4,....BIN10 ( MUST BE 10.  MAY BE CONTINUED ON NEXT CARD )
                        ( BINS FOR OUTPUT OF PERSONNEL-BY-DOSE ARE CENTERED ABOUT THESE VALUES.  DO NOT INPUT 0. FOR BIN1.
                          BIN10 IS USUALLY = MAX DOSE )
                        NUCNTL,VALUE
                           ( NUCNTL CONTROLS ETI/PCI USAGE (MAINLY FOR SENSITIVITY STUDIES) )
                           NUCNTL = 0 : VIS. DIS. USES N/GAMMA RATIO ( DEFAULT )
                                  = 1 : TIME-OF-DTH, BUT NO ETI
                                  = 2 : NO T-O-DTH OR ETI
                                  = 3 : N/GAMMA FORCED TO 3.0
                                  = 4 :   "       "     " 0.4
                                  = 5 : P A W DATA
LETHAL DOSE  <VALAURC>  NUCLEAR  OR  TOXIC
                        DESCRIPTION( <= 12 CHARACTER HOLLARITH STRING, KILL CRIT., LETHAL DOSE
                             KILL CRIT. IS CODE NO. SPECIFIED ON DEPLOYMENT CARDS: NUC < 1-5 >, TOX < 1-20 >
                             LETHAL DOSE IS IN RADS (NUKE)
                             LETHAL DOSE IS RELATIVE TO "STND. LETHAL DOSE" ( AS USED TO NORMALIZE UNIT 4 ) FOR TOXIC
MOPP                    DESCRIPTION ( <= 12 CHARACTER HOLLERITH STRING ), USER-CHOSEN CODE < 0-8 > , TRANSMISSION FACTOR
                        USER CODES DEFALT TO 0-4: "OPEN","MOPP I", ETC.
                        TRANSMISSION FACTOR ( 0.0-1.0 ) GIVES AMOUNT OF DOSAGE COMPARED TO OPEN AIR
                        OTHER OPTIONS:
                              'ALL CLEAR YES', OR 'ALL CLEAR NO'
                                   ( IF YES (DEFAULT), ALL PERSONNEL UNMOPP WHEN LAST OF CONTAMINATION IS GONE )
                              'PROXIMITY', DIST ( WHERE DIST IS DISTANCE FROM A WARHEAD ( IN X AND Y - DEFINES RECTANGULAR AREA )
                                 WITHIN WHICH A TGT PT MUST LIE FOR AN ASSET AT THE TGT PT TO "HEED" THE INCOMING RD. AND MOPP-UP )
                                 ( SEE "ROUND YES" OPTION, BELOW )  ( DEFAULT IS DIST = INFINITY ( 1.E35 ) )
                              'RECONSTITUTION YES', OR 'RECONSTITUTION NO'
                                   ( IF YES (DEFAULT=NO), ALL PERSONNEL ARE AUTOMATICALLY MOPPED AFTER RECONSTITUTION
                                     AFTER ANY TOXIC ROUND.  NEGATES PROXIMITY OPTION )
                              'RECOVERY TIME', TRCVR
                                   ( TRCVR IS TIME TO REALIZE THAT AIR IS CLEAR AND RETURN TO ORIG. MOPP POSTURE ( DEFAULT = 30. ) )
                              'ROUND YES' [, TIME FOR FALSE ALARM], OR 'ROUND NO'
                                   ( IF YES (DEFAULT), PERSONNEL CHANGE MOPP ON ANY INCOMING ROUND )
                                   ( FALSE ALARM TIME = TIME TO REALIZE THAT ROUND IS NOT TOXIC, AND UNMOPP ( DEFAULT = 10. ) )
                              'TIME SPREAD', STMPTM
                                   ( STMPTM IS THE (REAL) FRACTIONAL STND. DEV. IN MOPP TIME ( DEFAULT = .2 ) )
NUCLEAR                 ( NO DATA FOLLOWS IN RUNSTREAM - DATA READ FROM UNIT 3 ( SEE NUCLEAR DATA, BELOW ) )
SHIELDING               DESCRIPTION ( <= 12 CHARACTER HOLLERITH STRING ), USER-CHOSEN CODE < 4 - 61 >, NUCLEAR TRANSMISSION FACTORS
                         TRANSMISSION FACTORS ARE THE RATIOS BETWEEN "INSIDE" AND FREE-FIELD DOSE
                        FOUR FACTORS ARE GIVEN, IN THE FOLLOWING ORDER: (N,N), (G,N), (N,G), (G,G)
                             WHERE (N,G) IS THE NUMBER OF GAMMAS INSIDE DUE TO 1 NEUTRON OUTSIDE, ETC.
                        IF ONLY ONE FACTOR IS GIVEN, IT IS USED AS (N,N) AND (G,G);  (N,G) AND (G,N) ARE SET TO 0.
                         [$ASSET NAME]
                         OPTION: A CONTINUATION CARD BEARING A ASSET ( LIKE A VEHICLE ) NAME ATTACHES THERMAL PROTECTION AND BLAST
                                 VULNERABILITY OF THE NAMED ASSET TO THE USER-CHOSEN CODE
                         ** NOTE: **
                                 NUCLEAR POSTURE CODES 1 - 3 ARE RESERVED FOR OPEN, OPEN-BUT-THERMALLY-SHIELDED, AND FOXHOLE.
                                 PERSONNEL IN CODES 1 - 3 ARE SUBJECTED TO BLAST AND THERMAL KILLS IN ACCORD WITH USANCA ALGORITHMS
                                 NO SHIELDING VEHICLE CAN BE ATTACHED TO 1 - 3 VIA ABOVE OPTION
                                 NUCLEAR POSTURE CODES 4, 5 DEFAULT TO TRANSMISSION FACTORS FOR APC AND TANK RESPECTIVELY
                                 HOWEVER, NO ASSET IS ATTACHED UNLESS INPUT BY USER
                        ** NOTE: **
                                 CURRENTLY, NUCLEAR POSTURE CODES ONLY AFFECT PERSONNEL.  EQUIPMENT ARE GIVEN PARTICULAR POSTURES
                                 THROUGH CHOICE OF NUCLEAR VULNERABILITY DATA ( ON UNIT 3 )
SUBLETHAL DOSE DEGRADATION  'READ' - CAUSES CODE TO READ DEGRADATION DATA FROM UNIT 11. ( SEE BELOW )
```

```
                        LINK NAME, DEGRADATION CODE NUMBER - ASSOCIATES DEGRADATION DATA SET OF CORRESPONDING CODE NUMBER
                             ( INPUT VIA UNIT 21 )  WITH ANY INDIVIDUAL ASSIGNED TO NAMED LINK.  DEFAULT = 0.
                             ( USED TO DETERMINE PERFORMANCE DEGRADATION AS A FUNCTION OF DOSE AND ELAPSED TIME. )
THERMAL                 'ATMOSPHERE,' QUALITY - WHERE QUALITY MUST BE ONE OF THE FOLLOWING WORDS:
                        'GOOD', 'AVERAGE' ( THE DEFAULT ), OR 'POOR'
                        ANOTHER OPTION:
                        'UNIFORM', TYPE - WHERE TYPE MUST BE 'SUMMER' ( THE DEFAULT ), OR 'WINTER'
                        NOTE: PERSONNEL IN MOPP GEAR ARE AUTOMATICALLY GIVEN WINTER UNIFORM PROTECTION
T.K.C. (TOX.KILL CODE)  DESCRIPTION( <= 12 CHARACTER HOLLARITH STRING, KILL CRIT., DOSE MULTIPLIER
                             KILL CRIT. IS CODE NO. SPECIFIED ON DEPLOYMENT CARDS < 1-20 >
                        DOSE MULTIPLIER ALLOWS FOLKS AT SPECIFIED TGT PT TO GET A HIGHER DOSE (E.G. DUE TO HIGHER RESPIRATION RATE)
                        FOR HIGH RESP. RATE, DOSE MULT. > 1.  FOR NORMAL FOLKS, DOSE MULT. = 1.
                             RECALL, FOR TOXIC, DOSE IS RELATIVE TO "STND. LETHAL DOSE" ( AS USED TO NORMALIZE UNIT 4 )
TOXIC DATA              ( NO DATA FOLLOWS IN MAINSTREAM - DATA READ FROM UNIT 4 ( SEE TOXIC DATA, BELOW ) )
YIELD                   WEAPON NAME, YIELD(BLAST)C, YIELD(RADIATION)]
                        ( YIELDS IN KT.  IF ONLY BLAST YIELD GIVEN, IT IS USED FOR BOTH )


                        CONTROL INPUTS
                        ..............

GO                      ( NO DATA FOLLOWS - CAUSES ENCOUNTER EXECUTION )
HEADING                 READ ONE HOLLERITH STRING - ENCOUNTER OUTPUT HEADING
MODE                    OPTION, 'ON' OR 'OFF'
                                CODE ( DUMPS A NUMBER OF CALCULATIONS FOR CODE-DEBUGGING )
                                DEBUG ( PROCESS INPUT, BUT DO NOT EXECUTE )
                                METICULOUS ( PUNCTILIOUS HANDLING OF COMPOUND LINKS - MAY BE TIME-CONSUMING )
                                PRIORITY ( FOR COMPOUND LINKS, TAKES CPL PARTS IN THE ORDER
                                          THEY WERE INPUT, AND WILL NOT TRY TO FILL SUBSEQUENT
                                          PART UNLESS ALL PREDECESSORS HAVE BEEN IMPROVED )
                                STOCHASTIC LETHALITY ( WHEN ON, ALL KILLS ARE 0 OR 1. LETHALITY ROUTINES DRAW A RANDOM NUMBER
                                         FROM A UNIFORM (0,1) DISTRIB. AGAINST PK.  WHEN OFF ( DEFAULT ), FRACTIONAL KILL = PK )
                                ( NOTE ON IMPLEMENTATION:  ONLY ONE STOCHASTIC PK IS DETERMINED PER TGT PT PER ASSET PER ROUND.
                                    THUS, MULTIPLE ITEMS AT ONE DEPLOYMENT POINT ( "NO. THERE"=>1 ON DEPLOYMENT CARD
                                    ( SEE "DEPLOY", ABOVE ) ) WILL BE KILLED AS A GROUP, NOT INDEPENDENTLY )
                                 TIME BEFORE ZERO, TIMEB4  ( WHERE TIMEB4 IS A FLOATING POINT NUMBER ( NOT 'ON' OR 'OFF'))
                                         ( ALLOWS SPECIFYING TIME BEFORE START OF ENCOUNTER WHICH UNIT
                                           INITIALLY HAS ORGANIZE.  DEFAULT IS INF.)
INTERNAL RECONS. TIME   TIMES(INTRVL)( REAL ) AFTER ARRIVAL OF  RND AT WHICH RECONSTITUTION IS TO BE EVALUATED < 47 INTRVLS >
                             RECONSTITUION SUPPRESSED IF ANOTHER RND ARRIVES IN THE MEANTIME
OUTPUT OPTIONS          OPTION, 'ON' OR 'OFF' ( OR 'PARTIAL' OR 'FULL', AS SPECIFIED )
                        OPTIONS:
                                BINS, STRT1, STP1, STRT2, STP2,... ( DUMPS CONTENTS OF ALL DOSAGE BINS AT ALL
                                        RECONSTITUTIONS THAT OCCUR BETWEEN THE SPECIFIED START AND STOP TIMES )
                                CASUALTIES ( INCLUDES WEAPON INFO IF 'WEAPON' ISN'T ON )
                                CHAIN ( PRINTS LINE-PRINTER PLOT OF CHAINS.  DEFAULT=ON )
                                DEPLOYMENT PLOT ( DEFAULT=ON )
                                DOSE ( NUCLEAR AND TOXIC )
                                DUMP8 ( WRITES - ON UNIT 8 - TIME, FFF.,WK LNK, STR CHN FOR EVERY RECONST. )
                                DUMP9 ( BINARY WRITES - ON UNIT 9 - REPL, RD ID, TIME, AGZ, DGZ FOR EVERY ROUND )
                                ETIPCI ( AT-END-AVERAGE OF ETIS AND PCIS VS. TIME )
                                INPUT LISTING ( LISTS ( CODE-INTERPRETED ) INPUT DATA AT TOP OF OUTPUT.  DEFAULT=ON )
                                ITERATION( OUTPUT AFTER EACH )
                                LETHALITY (LISTING OF UNIT 2, UNIT 3, +/- UNIT 4 AT END OF RUN)( DEFAULT=ON )
                                LINK SUMMARY ( LINK1, LINK2, ... / OR LINK SUMMARY, OFF ( NO. TIMES WEAKEST BY CHAIN < MAX: 12 > ) )
                                OPTIMIZE, STRT1, STP1, STRT2, STP2,... ( DUMPS WALK-BACK INFO AND EFFECTIVENSS PARAMETERS
                                        FOR EVERY SUBSTITUTION ATTEMPTED DURING EVERY LINK OPTIMIZATION DURING ALL
                                        RECONSTITUTIONS THAT OCCUR BETWEEN THE SPECIFIED START AND STOP TIMES )
                                POSTURE ( REPORTS ALL POSTURE CHANGES )  ( PARTIAL SUPPRESSES EACH INDIVIDUAL INTO MOPP REPORT )
                                PRINT7 ( PRINT ON ALT. PRNT. FILE 7 )
                                RANDOM NUMBER ( AT START OF EA. ITER. )  (DEFAULT=ON)
                                RECONSTITUTION ( OUTPUT AFTER EACH ) ( PARTIAL GIVES LINKS ONLY )
                                REPAIR REPORT ( ALL REPAIR ORDERS AND RETURNS )( FULL GIVES COMPLETE JUNKYARD STAUS, EA. RECONST. )
                                SUMMARY ( NAME1, NAME2, ... / OR SUMMARY, OFF ( SUP OF SURVIVORS HAVING SAME NAME < MAX: 13 > ) )
```

```
                                TIMER,ION,OFF,OPTIMIZATION,RECONSTITUTION,INPUT]  ( TIMES PROGRAM PARTS )  ( DEFAULT=ON )
                                WEAPON ( REPORTS ACTUAL BURST POINT, ETC. OF EVERY WARHEAD )
PARTICULAR ASSETS                 NAMES OF ASSETS TO BE INCLUDED IN CASUALTY REPORTS, DOSAGES, CONTAMINATIONS, ETC. 'CLEAR' REMOVES THE OPTION
                                     = 'OTHER' TO SET SEED(2) USED IN MOPP TIMES, REPAIR LETH., ETC.
                                     = 'FAILURE' TO SET SEED(3) FOR FAILURES
RECONSTITUTION EVENT            TIME - INSERTS A NUL LETHALITY EVENT, CAUSI G RECONS. AT TIME INTERVALS SPECIFIED UNDER INTERNAL
REPLICATIONS                    NO. OF REPLICATIONS PER ENCOUNTER
                                     < NO MAX.  HOWEVER, SOME BOOKKEEPING LIMITED BY SIZE OF PACKED WORDS.  ON COC, LIMIT = 256 >
SEEDS (RANDOM NUMBER)           WORD, INTEGER R.N. SEED FOR ENCOUNTER
                                WHERE WORD = 'WEAPON' TO SET SEED(1) FOR WEAPON TLES AND DELIVERIES
                                             'OTHER' TO SET SEED(2) FOR RANDOM EVENTS OTHER THAN THOSE LISWITH SPECIFIC SEEDS
                                             'FAILURE' TO SET SEED(3) FOR RANDOM FAILURE EVENTS
SELECTIVE DEPLOYMENT PLOT   NAMES OF FUNCTIONAL GROUPS TO BE INCLUDED IN DEPLOYMENT PLOT. 'CLEAR' REMOVES THE OPTION
STOP                          END OF RUN. NO INPUT FOLLOWS
SUBSEQUENT MISSION              ( NO DATA FOLLOWS THIS CARD - AFTER ENCOUNTER, SURVIVORS ARE SAVED. )
 *** CURRENTLY ***              AFTER '30' CARD, NEW LINKS, CHAINS, HEADINGS CAN BE INPUT FOR OPTIMIZATION
 *** DISABLED ***               END SUCH INPUT WITH ANOTHER '60'. SUBSEQUENT MISSIONS CAN BE LINKED
TRACE                           ( THIS OPTION REPORTS OCCURANCES OF USER SPECIFIED EVENTS )
                                ( WHEN USED IN CONJUNCTION WITH THE RANDOM OPTION ( UNDER OUTPUT ), TRACE AIDS THE USER IN
                                REPLAYING SPECIFIC REPLICATIONS OF INTEREST )
                                ( INPUT DEPENDS ON OCCURANCE TYPE BEING TRACED. TO WIT : )
                                'WEAK LINK', LINK NAME, RECONST. NO. OR 'ANY' ( REPORTS OCCURANCES OF SPECIFIED LINK BEING WEAKEST )
                                'USES', LINK NAME, RECONST. NO. OR 'ANY' ( REPORTS OCCURANCES OF SPECIFIED LINK BEING USED )
                                     < MAX: 17 LINKS >


                                CONVENTIONAL LETHALITY DATA ( UNIT 2 )
                                **************************************

WEAPON
TARGET, DATA TYPE : 2 = CARLETON FUNCTION, 3 = 1-CONTOUR COOKIE CUTTER, 4 = ICM, 5 = 2-CONTOUR COOKIE
                  : 6 = 3-COOKIE, 7 = FRONT/BACK ASYMETRIC CARLTON
                  : 8 = ASYM. 1-COOKIE , 9 = ASYM. 2-COOKIE, 10 = ASYM. 3-COOKIE
                  : ( ASYM. FORMAT: RX FOR TRGT X > BURST, RY, RX FOR TRGT X < BURST )
NHOB, NOMINAL HOB VALUE FOR WHICH EACH LETHALITY APPLIES
      ( RCC CONSTRUCTS RANGES ABOUT EACH HOB TO INTERPOLATE FOR ANY HOB )
NPOSTURES, DESCRIPTIONS
NKILLCRITERIA, DESCRIPTIONS
     ..........................................
     ...NHOB*NPOSTURES*NKILLCRITERIA DATA CARDS...
     ...EACH DATA CARD CONTAINS:...
                                DATA TYPE 2: 3 ( REAL ) VALUES
                                DATA TYPE 3: 3 ( REAL ) VALUES - PK, RX, RY
                                DATA TYPE 4: 1 ( REAL ) VALUES
                                DATA TYPE 5: 6 ( REAL ) VALUES
                                DATA TYPE 6: 9 ( REAL ) VALUES
                                DATA TYPE 7: 4 ( REAL ) VALUES
                                DATA TYPE 8: 4 ( REAL ) VALUES - PK, RX, RY, RXP
                                DATA TYPE 9: 8 ( REAL ) VALUES
                                DATA TYPE 10: 12 ( REAL ) VALUES
     ..........................................

 LOOP BACK FOR NEW TARGET
END - LOOP BACK FOR NEW WEAPON
END - EXIT BACK TO MAIN ROUTINE



                                NUCLEAR VULNERABILITY DATA ( UNIT 3 )
                                **************************************

TARGET ( ASSET ), CODE, DATA ( AS REQUIRED BY CODE )
                                CODES:  1 = EMP, 2 = TREE, 3 = 1+2, 4 = BLAST, 5 = 1+4, 6 = 2+4, 7 = 1+2+4
                                DATA: AS SPECIFIED BY NUDACC
```

```
                              EMP: MU AND SIGMA
                              TREE: T2, MU, AND SIGMA
                              BLAST: K, MU, AND SIGMA
                         ORDER: AS NEEDED, EMP, THEN TREE, THEN BLAST

                         *** AUXILIARY PROGRAM RCCFILE.4T03 ***
     MAINTAINS DATA BASE UNIT 4 ( NUDACCDATA )
     MAKES FILE 3 IN PROPER FORMAT FOR RCC RUNS
     XQT 4T03R3. INSTRUCTIONS APPEAR INTERACTIVELY


                         TOXIC DISSEMINATION DATA ( UNIT 4 )
                         ***********************************

WEAPON NAME
'CONTAMINATION', NNXC ( NO. OF DOWNWIND POINTS )     ( ONLY NEEDED IF WPN PRODUCES LIQUID CONTAMINATION )
     ..................................................
     NNXC CARDS, EACH CONTAINING:
     DWNWND DISTANCE, - X-WND WIDTH, + X-WND WIDTH, CNTM ARRIVAL TIME, CNTM EVAPORATION TIME
     ..................................................
'VAPOR',NTV,NXV,NYV ( NO. OF TIME, X, AND Y PTS. )   ( ONLY NEEDED IF WPN PRODUCES VAPOR HAZARD )
TV(K), K=1,NTV   ( THE ARRAY OF TIME POINTS )
XV(K), K=1,NXV   ( THE ARRAY OF DNWND POINTS )
YV(K), K=1,NYV   ( THE ARRAY OF X-WND POINTS )
     ..................................................
     'TIME =' TV(I)
     ..............................
     'X(DWNWND) =' XV(J)
     ..............................
     DOSAGE3(T,X,Y) FOR ALL Y IN THE YV ARRAY
     ..............................
     LOOP ON XV(J)
     ..............................
     LOOP ON TV(I)
     ..................................................
END

                         *** AUXILIARY PROGRAM PRETOX ***
     TAKES FILE OUTPUT BY NUSSE II ( ON UNIT 9 ) AS INPUT
     INTERACTIVELY ASKS FOR INFORMATION:
          AMOUNT OF CONTAMINATION TO BE CONSIDERED AS CONTAMINATED
          PRIMARY OR SECONDARY VAPOR
          Z-LEVEL ( HEIGHT AT WHICH DOSAGES ARE TO BE EXTRACTED )
          LETHAL DOSE FOR NORMALIZATION
     MAKES TOXIC DATA FILE ON UNIT 4


                         PERFORMANCE DEGRADATION DATA ( UNIT 11 )
                         ***************************************

18 CHARACTER DESCRIPTION, CODE NUMBER FOR THE DATA SET  ( 1 - 5 )
NUMBER OF DOSES ( ND ), AND THEIR VALUES
NUMBER OF TIMES ( NT ), AND THEIR VALUES

    FOR EACH DOSE :
        A SET OF NT DEGRADATION VALUES, CORRESPONDING TO THE SPECIFIED ELAPSED TIMES
    ( ND SUCH SETS FOR THE ND SPECIFIED DOSES )
END  ONLY AT END OF TAPE 11
```

APPENDIX B

RUN #1 OUTPUT

THIS IS AUPA (ARMY UNIT RESILIENCY ANALYSIS) - LAST UPDATED: < 13 JUN 83 >
****

****
THIS JOB WAS STARTED ON FRIDAY
THE 26TH DAY OF AUGUST ANNO DOMINI 1983
AT 16 MINUTES BEFORE THE HOUR OF 3 O'CLOCK IN THE AFTERNOON
****

ZZTIMERZZ TIMER AT BEGINNING = 2.325

MNEMONIC CONTROL CARDS
****

1. DEPLOY

!!* WARNING *!*!* COULD NOT FIND FG ON LINK NAMED HANDLOAD DUMMY LINK CREATED
2. LINKS
FNCTNL GRP REPERTOIRE DOES NOT INCLUDE HANDLOAD
*** WARNING *** LINK HANDLOAD HAS NO CORRESPONDING FG - ASSUMING DUMMY LINK
3. SUBCHA
4. ORLINK
5. COMPOU
6. CHAINS
7. MODF
8. HEADIN
9. GO

```
ENCOUNTER NUMBER   1

FIRST EXAMPLE RUN - DEBUG
*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.*.

        ((( RANDOM NUMBER SEEDS AT START =       1999.      2999.      3999.      4999.      5999. )))

                EVENT      OPERANT     WPN TYPE/   NO.RNDS/              DGZ/TLE                     VOLLEY   VOLLEY
 EVENT  TIME     TYPE       CHAINS     RECUPTIME    +/- RAM      X          Y          Z          ANGLE    LENGTH        JEVNT
.........................................................................................................................


MISCELLANEOUS VALUES
...................
NO. OF REPLICATIONS =        1
SIGNIFICANCE FOR SUBSTITUTION =   .[illegible]5
TIMES FOR INTERNAL RECONSTITUTION EVALUATION =      1[illegible].0

>>>>>>>> INCOMING FIRE DIRECTION ( MEASURED CCW FROM THE TARGET X AXIS ) IS    0.0 DEGREES <<<<<<<<
>>>>>>>> DOWN WIND DIRECTION ( MEASURED CCW FROM THE TARGET X AXIS ) IS    0.0 DEGREES <<<<<<<<


***************************************************************

   DETERMINISTIC LETHALITY.  FRACTIONAL KILLS ARE ACCOUNTED

***************************************************************


FG  VRS IVL CNTBU PRSFC-MX/MN GRNUL  EXPND RT    NO.    NAMES
..  ... ... ..... ........... .....  ........    ...    .....

 1   1  -1         1.00/ 1.00  1.00              1.00   TRUCK, TRK
 2   1  -1         1.00/ 1.00  1.00              1.00   FKLFT
 3   1  -1         1.00/ 1.00  1.                1.00   CRANE, TRK
 4   1  -1         1.00/ 1.00  1.00              1.00   RADIO, TALKY
 5   [illegible]  -1         1.00/ 1.00  1.00              2.00   ALARM, TALKY
 6   1  -1         1.00/ 1.00  1.00              1.00   TELE, TALKY
 7   [illegible]   0                      1.00              1.00   R/T OP, PERSONNEL
 8   7   0                      1.00              1.00   LOADMSTR, PERSONNEL
 9   5   0                      1.00              1.00   DRIVER, PERSONNEL
10   [illegible]   [illegible]                      1.00              6.00   MEN, PERSONNEL
11   6   0                      1.00              1.00   FKLFT OP, PERSONNEL
12   6   0                      1.00              1.00   CRANE OP, PERSONNEL
13   6   0                      1.00              1.00   RIGGER, PERSONNEL

DEGRADATION BY MOPP AND DOSE
TOXIC KILL CRITERIA
TOXIC TRANSMISSION FACTORS
**************************
                   .              0         1        2         3        4
 TOXIC K.C. CODE. KILL DOSE  MOPP 0   MOPP I   MOPP II   MOPP III MOPP IV
*************************************************************************
DEFALT MAN     1 .      1.00    1.00      .90       .7[illegible]       .5[illegible]      .25
               2 .     -1.00    1.00     ****      ****      ****     ****
               3 .     -1.00    1.00     ****      ****      ****     ****
               4 .     -1.00    1.00     ****      ****      ****     ****
               5 .     -1.00    1.[illegible]     ****      ****      ****     ****
.........................................................................
```

TRANSMISSION FACTORS 1.00 1.00 1.00 .50 0.00

LINKS
*****

LNK	NAME	HOME FG	INLNK	MAX IN	MAX EFF(%)	MIN IN	MIN EFF(%)	MAX INLINK	ASSOCIATED LINK
1	HANDLOAD	6	-5.00	5.00	65	1.00	0	UNLMTD	NONE
2	DRIVER	9	1.00	1.00	100	0.00	0	1.00	TRUCK
3	RADIO	4	1.00	1.00	100	0.00	0	UNLMTD	NONE
4	TELE	5	1.00	1.00	100	0.00	0	UNLMTD	NONE
5	TRUCK	1	1.00	1.00	100	0.00	0	UNLMTD	NONE
6	CRANE OP	12	1.00	1.00	100	0.00	0	1.00	CRANE
7	RIGGER	13	1.00	1.00	100	0.00	0	UNLMTD	NONE
8	R/T OP	7	1.00	1.00	100	0.00	0	1.00	NONE
9	FKLFT	2	1.00	1.00	100	0.00	0	UNLMTD	NONE
10	CRANE	3	1.00	1.00	100	0.00	0	UNLMTD	NONE
11	FKLFT OP	11	1.00	1.00	100	0.00	0	1.00	FKLFT
12	LOADMSTR	8	1.00	1.00	100	0.00	75	2.00	NONE
95	NOT IN LINK		0.00						

LNKFG

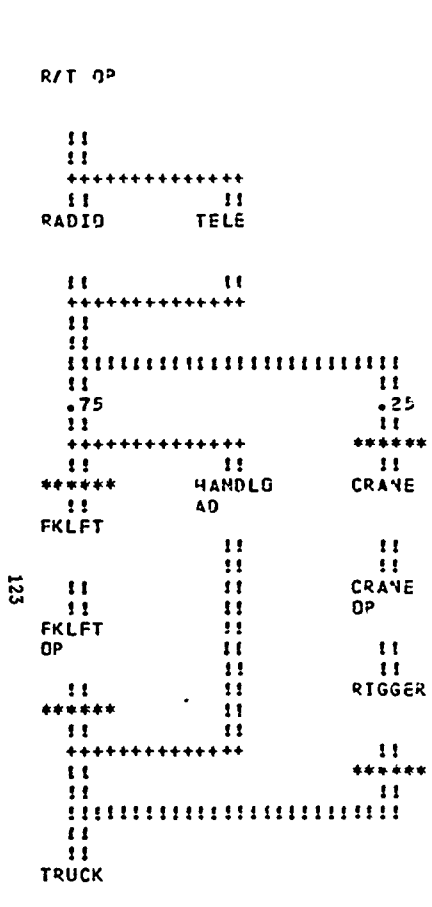
KEY: SUBST. TIME/SUBST. EFFECTIVENESS/SUBST. ORDER-READ-IN

FUNCTIONAL GROUP	1 HANDLOAD	2 DRIVER	3 RADIO	4 TELE	5 TRUCK	6 CRANE OP	7 RIGGER	8 R/T OP	9 FKLFT	10 CRANE	11 FKLFT OP
1 TRUCK	>				H						
2 FKLFT	>								H		
3 CRANE	>									H	
4 RADIO	>		H								
5 ALARM	>										
6 TELE	>			H							
7 R/T OP	> 5/1.0/1	15/.85/1					5/.60/1	H			5/.20/3
8 LOADMSTR	> 5/1.0/1	15/.85/1				5/1.0/3	5/.60/1	20/1.0/1			5/1.0/2
9 DRIVER	> 5/1.0/1	H					5/.60/1	15/.80/2			5/.20/3
10 MEN	> 5/1.0/1	15/.85/1					5/.60/1	15/.80/2			5/.20/3
11 FKLFT OP	> 5/1.0/1	15/.85/1				10/.80/1	5/.60/1	15/.80/2			H
12 CRANE OP	> 5/1.0/1	15/.85/1				H	5/.60/1	15/.80/2			10/.90/1
13 RIGGER	> 5/1.0/1	15/.85/1				5/.50/2	H	15/.80/2			5/.20/3

FUNCTIONAL GROUP	12 LOADMSTR	95 NOLINK
1 TRUCK	>	
2 FKLFT	>	
3 CRANE	>	
4 RADIO	>	
5 ALARM	>	P
6 TELE	>	
7 R/T OP	>	
8 LOADMSTR	> H	

```
 9 DRIVER              >        !        !
10 MEN                 >        !   M    !
11 FKLFT OP            >        !        !
12 CRANE OP            >        !        !
13 RIGGER              >        !        !


LINKS IN EACH SUBCHAIN
**********************

SUBCHAIN  LINKS
---------------

   *1      9    11
   *2     10     6     7


LINKS IN EACH ORLINK
********************

ORLINK    LINKS
---------------

   +1       3        4
   +2     *1         1


COMPOUND LINKS
**************

CPLNK              .  CPPARTS
                   .
LOADING TECHNIQUE  .  +2                  *2
                   .  ( .75)              ( .25)
                   .


SEGMENTS IN EACH CHAIN
**********************

                         CHAINS
SEG \   1
-------------------------
        .
  1     . R/T OP
  2     . +1
  3     . LOADING TECHNIQUE
  4     . TRUCK
  5     . LOADMSTR
```

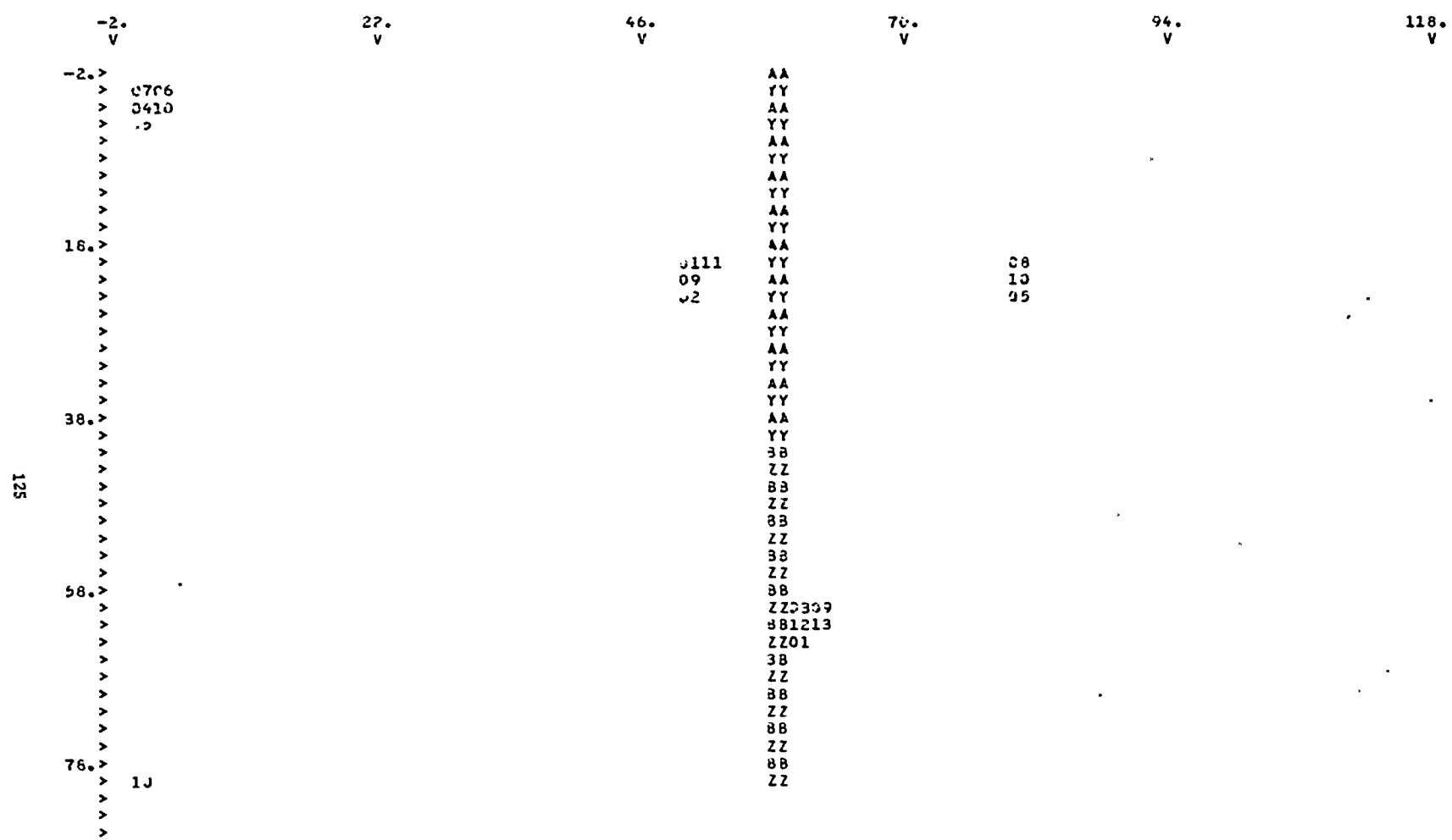
*** PLOT OF CHAIN # 1 OPERANT TIMES:(0.00 - INF.)



DEPLOYMENT
****

	FG		LNK	XTAR	YTAR	MODMNY	KCAT	NKCAT	TKCAT	PSTR	NUCVR	MOPP
1	7	R/T OP	8	0.0	[illegible]	1.00	1	1	2	1	1	0
2	4	RADIO	8	[illegible]	[illegible]	1.00	1	1	1	1	1	0
3	5	ALARM	95	0.0	0.0	1.00	1	1	1	1	1	0
4	6	TELE	4	[illegible]	[illegible]	1.00	1	1	1	1	1	0
5	10	MEN	95	0.0	1.0	2.00	1	1	1	1	1	1
6	1	TRUCK	8	20.0	50.0	.60	1	1	1	1	1	0
7	9	DRIVER	2	20.0	50.0	.60	1	1	3	1	1	0
8	2	FKLFT	9	20.0	30.0	1.00	1	1	1	1	1	0
9	11	FKLFT OP	11	20.0	50.0	1.10	1	1	3	1	1	0
10	0	HANDLOAD	1	20.0	50.0	-5.00	1	1	4	1	1	0
11	8	LOADMSTR	12	20.0	80.0	1.00	1	1	5	1	1	0
12	10	MEN	95	20.0	80.0	2.00	1	1	1	1	1	1
13	5	ALARM	95	20.0	80.0	1.00	1	1	1	1	1	0
14	3	CRANE	11	60.0	60.0	1.00	1	1	1	1	1	0
15	12	CRANE OP	8	60.0	50.0	1.00	1	1	3	1	1	0
16	1	TRUCK	2	60.0	60.0	.40	1	1	1	1	1	0
17	9	DRIVER	2	60.0	60.0	.40	1	1	3	1	1	0
18	13	RIGGER	7	60.0	50.0	1.00	1	1	4	1	1	0
19	10	MEN	95	80.0	0.0	2.00	1	1	1	1	1	1

DEPLOYMENT ********** Y (ACROSS) INTERVAL = X INTERVAL = 2. ..... INITIAL INCOMING DIRECTION FROM AA TO BB ********** DOWN WIND FROM YY TO ZZ **********



```
 !!!!!!!!! WARNING !!!!!!!!!!!!!
MAXIMUM RECONSTITUTION TIME =      .0 BUT SOME FG NEEDS    20.0 FOR SOME SUBSTITUTION
THEREFORE, SOME SUBSTITUTIONS WILL NEVER BE MADE
 !!!!!!!!! WARNING !!!!!!!!!!!!!


**** SUCCESSFULL INPUT DEBUG RUN!!! ****



MNEMONIC CONTROL CARDS
**********************

       1.  STOP



STOP READ BY INPUT ROUTINE. NORMAL STOP TAKEN
STOP CALLED FROM INPUT ROUTINE
```

APPENDIX C

RUN #2 OUTPUT

```
THIS IS AURA ( ARMY UNIT RESILIENCY ANALYSIS )  -  LAST U.DATED: < 10 JUN 83 >
*****************************************      ------------------------

          ***********************************************
                    THIS JOB WAS STARTED ON MONDAY
                 THE 29TH DAY OF AUGUST ANNO DOMINI 1983
        AT 13 MINUTES BEFORE THE HOUR OF 9 O'CLOCK IN THE MORNING
          ***********************************************

%%TIMER%%  TIMER AT BEGINNING =      2.331


MNEMONIC CONTROL CARDS
**********************

       1.  DEPLOY

*I*I* WARNING *I*I*  COULD NOT FIND FG OR LINK NAMED HANDLOAD            DUMMY LINK CREATED
       2.  LINKS
FNCTNL GRP REPERTOIRE DOES NOT INCLUDE HANDLOAD
*** WARNING *** LINK HANDLOAD          HAS NO CORRESPONDING FG  - ASSUMING DUMMY LINK
       3.  SUBCHA
       4.  ORLINK
       5.  COMPOU
       6.  CHAINS
       7.  HEADIN
       8.  FAILUR
       9.  INTERN
      10.  RECONS
      11.  REPLIC
      12.  GO
```

ENCOUNTER NUMBER 1

SECOND EXAMPLE RUN - FAILURES

*.

(((RANDOM NUMBER SEEDS AT START = 1999. 2999. 3999. 4999. 5999.)))

EVENT	TIME	EVENT TYPE	OPERANT CHAINS	WPN TYPE/ RECUPTIME	NO.RNDS/ +/- RAM	X	DGZ/TLE Y	Z	VOLLEY ANGLE	VOLLEY LENGTH	JEVNT		
1	0.00	INITIAL	1								0	0	0
2	0.00	USER RCNST	1								999	0	0
3	10.00	RCNSTITUTE	1	10.00							0	0	1
4	60.00	RCNSTITUTE	1	60.00							0	0	2
5	120.00	RCNSTITUTE	1	120.00							0	0	3
6	180.00	USER RCNST	1								999	0	0
7	190.00	RCNSTITUTE	1	190.00							0	0	1
8	240.00	RCNSTITUTE	1	240.00							0	0	2
9	300.00	RCNSTITUTE	1	300.00							0	0	3
10	360.00	USER RCNST	1								999	0	0
11	370.00	RCNSTITUTE	1	370.00							0	0	1
12	420.00	RCNSTITUTE	1	420.00							0	0	2
13	480.00	RCNSTITUTE	1	480.00							0	0	3
14	540.00	USER RCNST	1								999	0	0
15	550.00	RCNSTITUTE	1	550.00							0	0	1
16	600.00	RCNSTITUTE	1	600.00							0	0	2
17	660.00	RCNSTITUTE	1	660.00							0	0	3
18	720.00	USER RCNST	1								999	0	0
19	730.00	RCNSTITUTE	1	730.00							0	0	1
20	780.00	RCNSTITUTE	1	780.00							0	0	2
21	840.00	RCNSTITUTE	1	840.00							0	0	3
22	900.00	USER RCNST	1								999	0	0
23	910.00	RCNSTITUTE	1	910.00							0	0	1
24	960.00	RCNSTITUTE	1	960.00							0	0	2
25	1020.00	RCNSTITUTE	1	1020.00							0	0	3
26	1080.00	USER RCNST	1								999	0	0
27	1090.00	RCNSTITUTE	1	1090.00							0	0	1
28	1140.00	RCNSTITUTE	1	1140.00							0	0	2
29	1200.00	RCNSTITUTE	1	1200.00							0	0	3
30	1260.00	USER RCNST	1								999	0	0
31	1270.00	RCNSTITUTE	1	1270.00							0	0	1
32	1320.00	RCNSTITUTE	1	1320.00							0	0	2
33	1380.00	RCNSTITUTE	1	1380.00							0	0	3
34	1440.00	RCNSTITUTE	1	1440.00							0	0	4

MISCELLANEOUS VALUES

NO. OF REPLICATIONS = 50
SIGNIFICANCE FOR SUBSTITUTION = .005
TIMES FOR INTERNAL RECONSTITUTION EVALUATION = 10.0 60.0 120.0 180.0

\>>>>>>>> INCOMING FIRE DIRECTION (MEASURED CCW FROM THE TARGET X AXIS) IS 0.0 DEGREES <<<<<<<<
\>>>>>>>> DOWN WIND DIRECTION (MEASURED CCW FROM THE TARGET X AXIS) IS 0.0 DEGREES <<<<<<<<

DETERMINISTIC LETHALITY. FRACTIONAL KILLS ARE ACCOUNTED

FG	VRS	IVL	CNTBU	PRSFC-MX/MN	GRNUL	EXPND RT	NO.	NAMES
1	1	-1		1.00/ 1.00	1.00		1.00	TRUCK, TRK
2	1	-1		1.00/ 1.00	1.00		1.00	FKLFT
3	1	-1		1.00/ 1.00	1.00		1.00	CRANE, TRK
4	1	-1		1.00/ 1.00	1.00		1.00	RADIO, TALKY
5	0	-1		1.00/ 1.00	1.00		2.00	ALARM, TALKY
6	1	-1		1.00/ 1.00	1.00		1.00	TELE, TALKY
7	5	0			1.00		1.00	R/T OP, PERSONNEL
8	7	0			1.00		1.00	LOADMSTR, PERSONNEL
9	5	0			1.00		1.00	DRIVER, PERSONNEL
10	5	0			1.00		6.00	MEN, PERSONNEL
11	6	0			1.00		1.00	FKLFT OP, PERSONNEL
12	6	0			1.00		1.00	CRANE OP, PERSONNEL
13	6	0			1.00		1.00	RIGGER, PERSONNEL

DEGRADATION BY MOPP AND DOSE
TOXIC KILL CRITERIA
TOXIC TRANSMISSION FACTORS

TOXIC K.C.	CODE.	KILL DOSE	0 MOPP 0	1 MOPP I	2 MOPP II	3 MOPP III	4 MOPP IV
DEFALT MAN	1.	1.00	1.00	.90	.70	.50	.25
	2.	-1.00	1.00	****	****	****	****
	3.	-1.00	1.00	****	****	****	****
	4.	-1.00	1.00	****	****	****	****
	5.	-1.00	1.00	****	****	****	****
TRANSMISSION FACTORS			1.00	1.00	1.00	.50	0.00

RELIABILITY-TYPE FAILURES

FG		MTBTF	LITE	MED.
2	FKLFT	720.000	.800	.100
3	CRANE	1080.000	.800	.100

LINKS

LNK	NAME	HOME FG	INLNK	MAX IN	MAX EFF(%)	MIN IN	MIN EFF(%)	MAX INLINK	ASSOCIATED LINK
1	HANDLOAD	0	-5.00	5.00	65	1.00	0	UNLMTD	NONE
2	DRIVER	9	1.00	1.00	100	0.00	0	1.00	TRUCK
3	RADIO	4	1.00	1.00	100	0.00	0	UNLMTD	NONE
4	TELE	6	1.00	1.00	100	0.00	0	UNLMTD	NONE
5	TRUCK	1	1.00	1.00	100	0.00	0	UNLMTD	NONE
6	CRANE OP	12	1.00	1.00	100	0.00	0	1.00	CRANE
7	RIGGER	13	1.00	1.00	100	0.00	0	UNLMTD	NONE
8	R/T OP	7	1.00	1.00	100	0.00	0	1.00	NONE
9	FKLFT	2	1.00	1.00	100	0.00	0	UNLMTD	NONE
10	CRANE	3	1.00	1.00	100	0.00	0	UNLMTD	NONE
11	FKLFT OP	11	1.00	1.00	100	0.00	0	1.00	FKLFT
12	LOADMSTR	8	1.00	1.00	100	0.00	75	2.00	NONE

95 NOT IN LINK 8.00

LNKFG

KEY: SUBST. TIME/SUBST. EFFECTIVENESS/SUBST. ORDER-READ-IN

FUNCTIONAL GROUP	1 HANDLO AD	2 DRIVER	3 RADIO	4 TELE	5 TRUCK	6 CRANE OP	7 RIGGER	8 R/T OP	9 FKLFT	10 CRANE	11 FKLFT OP
1 TRUCK					H						
2 FKLFT									H		
3 CRANE										H	
4 RADIO			H								
5 ALARM											
6 TELE				H							
7 R/T OP	5/1.0/1	15/.85/1					5/.60/1	H			5/.20/3
8 LOADMSTR	5/1.0/1	15/.85/1				5/1.0/3	5/.60/1	20/1.0/1			5/1.0/2
9 DRIVER	5/1.0/1	H					5/.60/1	15/.80/2			5/.20/3
10 MEN	5/1.0/1	15/.85/1					5/.60/1	15/.80/2			5/.20/3
11 FKLFT OP	5/1.0/1	15/.85/1				10/.80/1	5/.60/1	15/.80/2			H
12 CRANE OP	5/1.0/1	15/.85/1				H	5/.60/1	15/.80/2			10/.90/1
13 RIGGER	5/1.0/1	15/.85/1				5/.50/2	H	15/.80/2			5/.20/3

FUNCTIONAL GROUP	12 LOADMS TR	95 NOLINK
1 TRUCK		
2 FKLFT		
3 CRANE		
4 RADIO		
5 ALARM		H
6 TELE		
7 R/T OP		
8 LOADMSTR	H	
9 DRIVER		
10 MEN		H
11 FKLFT OP		
12 CRANE OP		
13 RIGGER		

132

LINKS IN EACH SUBCHAIN
****

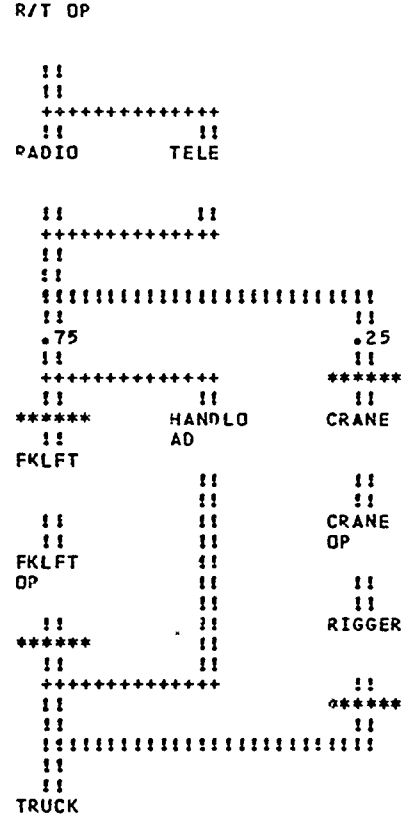
SUBCHAIN	LINKS
*1	9 11
*2	10 6 7

LINKS IN EACH ORLINK
++++++++++

ORLINK	LINKS

```
---------------

   +1        3        4
   +2      *1         1


COMPOUND LINKS
**************

CPLNK               .  CPPARTS
....................................................................
                    .
!LOADING TECHNIQUE  .  +2                    *2
                    .  ( .75)                ( .25)
                    .
                    .


SEGMENTS IN EACH CHAIN
**********************

                          CHAINS
SEG \   1
-------------------------
     .
  1  . R/T OP
  2  . +1
  3  . !LOADING TECHNIQUE
  4  . TRUCK
  5  . LOADMSTR
```

*** PLOT OF CHAIN # 1 OPERANT TIMES:(0.00 - INF.)



DEPLOYMENT
****

	FG		LNK	XTAR	YTAR	HOWMNY	KCAT	NKCAT	TKCAT	PSTR	NUCVR	MOPP
1	7	R/T OP	8	0.0	0.0	1.00	1	1	2	1	1	0
2	4	RADIO	3	0.0	0.0	1.00	1	1	1	1	1	0
3	5	ALARM	95	0.0	0.0	1.00	1	1	1	1	1	0
4	6	TELE	4	0.0	0.0	1.00	1	1	1	1	1	0
5	10	MEN	95	0.0	1.0	2.00	1	1	1	1	1	1
6	1	TRUCK	5	20.0	50.0	.60	1	1	1	1	1	0
7	9	DRIVER	2	20.0	50.0	.60	1	1	3	1	1	0
8	2	FKLFT	9	20.0	50.0	1.00	1	1	1	1	1	0
9	11	FKLFT OP	11	20.0	50.0	1.00	1	1	3	1	1	0
10	0	HANDLOAD	1	20.0	50.0	-5.00	1	1	4	1	1	0
11	8	LOADMSTR	12	20.0	80.0	1.00	1	1	5	1	1	0
12	10	MEN	95	20.0	80.0	2.00	1	1	1	1	1	1
13	5	ALARM	95	20.0	80.0	1.00	1	1	1	1	1	0
14	3	CRANE	10	60.0	60.0	1.00	1	1	1	1	1	0
15	12	CRANE OP	6	60.0	60.0	1.00	1	1	3	1	1	0
16	1	TRUCK	5	60.0	60.0	.40	1	1	1	1	1	0
17	9	DRIVER	2	60.0	60.0	.40	1	1	3	1	1	0
18	13	RIGGER	7	60.0	60.0	1.00	1	1	4	1	1	0
19	10	MEN	95	80.0	0.0	2.00	1	1	1	1	1	1

DEPLOYMENT Y (ACROSS) INTERVAL = X INTERVAL = 2. INITIAL INCOMING DIRECTION FROM AA TO BB DOWN WIND FROM YY TO ZZ

```
          -2.          22.          46.          70.          94.          118.
           V            V            V            V            V            V
-2.>                                            AA
   >  0706                                      YY
   >  0410                                      AA
   >  05                                        YY
   >                                           AA
   >                                           YY
   >                                           AA
   >                                           YY
   >                                           AA
   >                                           YY
18.>                                           AA
   >                                    0111   YY                08
   >                                    09     AA                10
   >                                    02     YY                05
   >                                           AA
   >                                           YY
   >                                           AA
   >                                           YY
   >                                           AA
   >                                           YY
38.>                                           AA
   >                                           YY
   >                                           BB
   >                                           ZZ
   >                                           BB
   >                                           ZZ
   >                                           BB
   >                                           ZZ
   >                                           BB
   >                                           ZZ
58.>                                           BB
   >                                           ZZ0309
   >                                           BB1213
   >                                           ZZ01
   >                                           BB
   >                                           ZZ
   >                                           BB
   >                                           ZZ
   >                                           BB
   >                                           ZZ
78.>                                           BB
   >  10                                       ZZ
   >
   >
   >
```

***WARNING!!** NO REPAIRS FOR ITEMS WHICH CAN FAIL REPAIRABLY

ENCOUNTER RESULTS - AVERAGED OVER 50 REPLICATIONS

**** REPEAT OF WARNINGS FROM THIS RUN ****

*I*I* WARNING *I*I* COULD NOT FIND FG OR LINK NAMED HANDLOAD DUMMY LINK CREATED
*** WARNING *** LINK HANDLOAD HAS NO CORRESPONDING FG - ASSUMING DUMMY LINK

***WARNING!!** NO REPAIRS FOR ITEMS WHICH CAN FAIL REPAIRABLY

*** EFFECTIVENESS VS. TIME ***

TIME	EFFECTIVENESS	100	90-99	80-89	70-79	60-69	50-59	40-49	30-39	20-29	10-19	1-9	0
0.00	1.00 +/- .000	50	0	0	0	0	0	0	0	0	0	0	0
10.00	1.00 +/- .005	49	0	0	1	0	0	0	0	0	0	0	0
60.00	.98 +/- .009	47	0	0	3	0	0	0	0	0	0	0	0
120.00	.96 +/- .015	44	0	0	5	0	0	1	0	0	0	0	0
190.00	.93 +/- .018	37	0	0	12	0	0	1	0	0	0	0	0
240.00	.90 +/- .019	32	0	0	17	0	0	1	0	0	0	0	0
300.00	.89 +/- .021	31	0	0	17	0	0	2	0	0	0	0	0
370.00	.85 +/- .024	26	0	0	19	0	0	5	0	0	0	0	0
420.00	.85 +/- .024	25	0	0	20	0	0	5	0	0	0	0	0
480.00	.84 +/- .024	23	0	0	22	0	0	5	0	0	0	0	0
550.00	.82 +/- .025	21	0	0	23	0	0	6	0	0	0	0	0
600.00	.81 +/- .024	19	0	0	25	0	0	6	0	0	0	0	0
660.00	.79 +/- .025	18	0	0	24	0	0	8	0	0	0	0	0
730.00	.77 +/- .025	15	0	0	26	0	0	9	0	0	0	0	0
780.00	.76 +/- .026	14	0	0	25	0	0	11	0	0	0	0	0
840.00	.75 +/- .025	12	0	0	27	0	0	11	0	0	0	0	0
910.00	.72 +/- .023	8	0	0	30	0	0	12	0	0	0	0	0
960.00	.71 +/- .023	7	0	0	30	0	0	13	0	0	0	0	0
1020.00	.71 +/- .023	7	0	0	30	0	0	13	0	0	0	0	0
1090.00	.71 +/- .023	7	0	0	29	0	0	14	0	0	0	0	0
1140.00	.70 +/- .024	7	0	0	28	0	0	15	0	0	0	0	0
1200.00	.70 +/- .024	7	0	0	28	0	0	15	0	0	0	0	0
1270.00	.70 +/- .024	7	0	0	27	0	0	16	0	0	0	0	0
1320.00	.69 +/- .023	6	0	0	27	0	0	17	0	0	0	0	0
1380.00	.67 +/- .023	5	0	0	26	0	0	19	0	0	0	0	0
1440.00	.67 +/- .022	4	0	0	27	0	0	19	0	0	0	0	0

FUNCTIONAL GROUP SURVIVORS - INCLUDING CONTAMINATED - VS. TIME FOR REPLICATION 0

.TRUCK	.FKLFT	.CRANE	.RADIO	.ALARM	.TELE	.R/T	OP.LOADMS.DRIVER.MEN			.FKLFT .CRANE .RIGGER.			
.	.	.	.	.	.	.	.TR	.	.	.OP	.OP	.	.
.	.	.	.	.	.	.	.	.	.	.	.	.	.

TIME	1	2	3	4	5	6	7	8	9	10	11	12	13
0.00	1.00	1.00	1.00	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
10.00	1.00	1.00	.98	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
60.00	1.00	.98	.96	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
120.00	1.00	.90	.96	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
190.00	1.00	.82	.90	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
240.00	1.00	.76	.86	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
300.00	1.00	.72	.86	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
370.00	1.00	.54	.78	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
420.00	1.00	.54	.76	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
480.00	1.00	.52	.74	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
550.00	1.00	.50	.70	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
600.00	1.00	.58	.68	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
660.00	1.00	.54	.66	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
730.00	1.00	.50	.62	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
780.00	1.00	.44	.62	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
840.00	1.00	.42	.60	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
910.00	1.00	.34	.58	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
960.00	1.00	.30	.58	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
1020.00	1.00	.30	.58	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
1090.00	1.00	.30	.56	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
1140.00	1.00	.28	.56	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
1200.00	1.00	.28	.56	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
1270.00	1.00	.26	.56	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
1320.00	1.00	.24	.54	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
1380.00	1.00	.22	.50	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00
1440.00	1.00	.22	.48	1.00	2.00	1.00	1.00	1.00	1.00	6.00	1.00	1.00	1.00

LINK RESULTS VS. TIME FOR REPLICATION 0

KEY: LINE1 = # OF ACTUAL USES (INCL. = 0 IF NOT IN CPLNK)
LINE2 = # OF TIMES WEAK BECAUSE ASSETS UNAVAILABLE
LINE3 = # OF TIMES WEAK, LIMITED BY NO. ALLOWED IN LINK
LINE4 = # OF TIMES = 0 IN COMPOUND LNK (THUS NOT COUNTED IN LINE1)
LINE5 = # OF AS-AVAILABLE USES (AS IN REPAIR)
LINE6 = NO. TIMES LIMITING IN AS-AVAILABLE USES

TIME	HANDLOAD 1	DRIVER 2	RADIO 3	TELE 4	TRUCK 5	CRANE OP 6	RIGGER 7	R/T OP 8	FKLFT 9	CRANE 10	FKLFT OP 11	LOADMSTR 12
0.00	0	0	50	0	50	50	50	50	50	50	50	50
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
10.00	0	0	50	0	50	49	49	50	50	49	50	50
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	1<<	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
60.00	1	0	50	0	50	48	48	50	49	48	49	50
	1<<	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	2<<	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0

120.00	5	0	50	0	50	48	48	50	45	48	45	50
	5<<	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	2<<	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
190.00	9	0	50	0	50	45	45	50	41	45	41	50
	9<<	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	5<<	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
240.00	12	0	50	0	50	43	43	50	38	43	38	50
	12<<	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	7<<	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
300.00	14	0	50	0	50	43	43	50	36	43	36	50
	14<<	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	7<<	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
370.00	18	0	50	0	50	39	39	50	32	39	32	50
	18<<	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	11<<	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
420.00	18	0	50	0	50	38	38	50	32	38	32	50
	18<<	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	12<<	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
480.00	19	0	50	0	50	37	37	50	31	37	31	50
	19<<	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	13<<	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
550.00	20	0	50	0	50	35	35	50	30	35	30	50
	20<<	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	15<<	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
600.00	21	0	50	0	50	34	34	50	29	34	29	50
	21<<	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	16<<	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0
660.00	23	0	50	0	50	33	33	50	27	33	27	50

	.	23<<	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	17<<	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
730.00	.	25	0	50	0	50	31	31	50	25	31	25	50
	.	25<<	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	19<<	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
780.00	.	28	0	50	0	50	31	31	50	22	31	22	50
	.	28<<	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	19<<	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
840.00	.	29	0	50	0	50	30	30	50	21	30	21	50
	.	29<<	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	20<<	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
910.00	.	33	0	50	0	50	29	29	50	17	29	17	50
	.	33<<	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	21<<	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
960.00	.	35	0	50	0	50	29	29	50	15	29	15	50
	.	35<<	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	21<<	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
1020.00	.	35	0	50	0	50	29	29	50	15	29	15	50
	.	35<<	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	21<<	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
1090.00	.	35	0	50	0	50	28	28	50	15	28	15	50
	.	35<<	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	22<<	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
1140.00	.	36	0	50	0	50	28	28	50	14	28	14	50
	.	36<<	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	22<<	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
1200.00	.	36	0	50	0	50	28	28	50	14	28	14	50
	.	36<<	0	0	0	0	0	0	0	0	0	0	0

	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	22<<	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
1270.00	.	37	0	50	0	50	28	28	50	13	28	13	50
	.	37<<	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	22<<	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
1320.00	.	38	0	50	0	50	27	27	50	12	27	12	50
	.	38<<	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	23<<	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
1380.00	.	39	0	50	0	50	25	25	50	11	25	11	50
	.	39<<	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	25<<	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
1440.00	.	39	0	50	0	50	24	24	50	11	24	11	50
	.	39<<	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	26<<	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0

COMPOUND LINK PARTS VS. TIME
****

AVERAGE EFFECTIVENESS USED, OVER ALL REPLICATIONS
(NOTE: IF CPL NOT WEAK, MORE CAPABILITY MAY HAVE BEEN AVAILABLE THAN WAS USED)

TIME	1	2
0.00	1.00	1.00
10.00	1.00	.98
60.00	.99	.96
120.00	.97	.96
190.00	.94	.90
240.00	.92	.86
300.00	.90	.86
370.00	.87	.78
420.00	.87	.76
480.00	.87	.74
550.00	.86	.70
600.00	.85	.68
660.00	.84	.66
730.00	.83	.62
780.00	.80	.62
840.00	.80	.60
910.00	.77	.58
960.00	.76	.58
1020.00	.76	.58
1090.00	.76	.56
1140.00	.75	.56
1200.00	.75	.56

1270.00	.74	.56
1320.00	.73	.54
1380.00	.73	.50
1440.00	.73	.48

SEGMENT RESULTS: CUMULATIVE TIMES WEAKEST VS. TIME

CHAIN #	1	1	1	1	1
SEGMENT #	1	2	3	4	5
TIME \ TYPE	8 + 1		1	5	12
0.00	0	0	0	0	0
10.00	0	0	1	0	0
60.00	0	0	3	0	0
120.00	0	0	6	0	0
190.00	0	0	13	0	0
240.00	0	0	18	0	0
300.00	0	0	19	0	0
370.00	0	0	24	0	0
420.00	0	0	25	0	0
480.00	0	0	27	0	0
550.00	0	0	29	0	0
600.00	0	0	31	0	0
660.00	0	0	32	0	0
730.00	0	0	35	0	0
780.00	0	0	36	0	0
840.00	0	0	38	0	0
910.00	0	0	42	0	0
960.00	0	0	43	0	0
1020.00	0	0	43	0	0
1090.00	0	0	43	0	0
1140.00	0	0	43	0	0
1200.00	0	0	43	0	0
1270.00	0	0	43	0	0
1320.00	0	0	44	0	0
1380.00	0	0	45	0	0
1440.00	0	0	46	0	0

CHAIN PESULTS VS. TIME
AVERAGE EFFECTIVENESS
NO. OF TIMES STRONGEST
(AVERAGE EFFECTIVENESS WHEN STRONGEST)

TIME	CHAINS 1
0.00	1.00
	50
	(1.00)
10.00	1.00
	50
	(1.00)
60.00	.98
	50
	(.98)
120.00	.96
	50
	(.96)
190.00	.93
	50
	(.93)
240.00	.90
	50
	(.90)
300.00	.89
	50
	(.89)
370.00	.85
	50
	(.85)
420.00	.85
	50
	(.85)
480.00	.84
	50
	(.84)
550.00	.82
	50
	(.82)
600.00	.81
	50
	(.81)
660.00	.79
	50
	(.79)

730.00 . .77
. 50
. (.77)

780.00 . .76
. 50
. (.76)

840.00 . .75
. 50
. (.75)

910.00 . .72
. 50
. (.72)

960.00 . .71
. 50
. (.71)

1020.00 . .71
. 50
. (.71)

1080.00 . .71
. 50
. (.71)

1140.00 . .70
. 50
. (.70)

1200.00 . .70
. 50
. (.70)

1260.00 . .70
. 50
. (.70)

1320.00 . .69
. 50
. (.69)

1380.00 . .67
. 50
. (.67)

1440.00 . .67
. 50
. (.67)

RELIABILITY-TYPE FAILURES

FG	LITEFAIL	MED.FAIL	DEADFAIL
2 FKLFT	.560	.080	.140
3 CRANE	.400	.080	.040

END-OF-ENCOUNTER SUMMARY
****

FUNCTIONAL GROUP		INITIAL	UNHARMED	CONTAMD	LIT DAM	MED DAM
1	TRUCK	1.00	1.00	0.00	0.00	0.00
2	FKLFT	1.00	.22	0.00	.56	.08
3	CRANE	1.00	.48	0.00	.40	.08
4	RADIO	1.00	1.00	0.00	0.00	0.00
5	ALARM	2.00	2.00	0.00	0.00	0.00
6	TELE	1.00	1.00	0.00	0.00	0.00

(((RANDOM NUMBER SEEDS AT END = 1999. 2999. 972717334. 4999. 5999.)))

COMPUTER TIME FOR ENCOUNTER ... 46.481 SECONDS

MNEMONIC CONTROL CARDS
****

1. STOP

146

STOP READ BY INPUT ROUTINE. NORMAL STOP TAKEN
STOP CALLED FROM INPUT ROUTINE

APPENDIX D

RUN #3 OUTPUT

THIS IS AURA (ARMY UNIT RESILIENCY ANALYSIS) - LAST UPDATED: < 6 JUL 84 >

```
          ********************************************
                THIS JOB WAS STARTED ON THURSDAY
              THE 12TH DAY OF JULY ANNO DOMINI 1984
                  AT 4 O'CLOCK IN THE AFTERNOON
          ********************************************

%%TIMER%%  TIMER. CPUTIM=BEGINNING =      2.089


MNEMONIC CONTROL CARDS
**********************

       1.  DEPLOY

*!*!* WARNING *!*!*  CAN NOT FIND ASSET OR LINK NAMED HANDLOAD            DUMMY LINK CREATED

*!*!* WARNING *!*!*  CAN NOT FIND ASSET OR LINK NAMED REPAIR              DUMMY LINK CREATED
       2.  LINKS

*** WARNING *** LINK HANDLOAD          HAS NO CORRESPONDINGLY NAMED ASSET - ASSUMING DUMMY LINK

*** WARNING *** LINK REPAIR            HAS NO CORRESPONDINGLY NAMED ASSET - ASSUMING DUMMY LINK
       3.  SUBCHA
       4.  ORLINK
       5.  COMPOU
       6.  CHAINS
       7.  HEADIN
       8.  FAILUR
       9.  INTERN
      10.  RECONS
      11.  REPLIC
      12.  EXPEND
      13.  REPAIR
      14.  OUTPUT
      15.  GO
```

ENCOUNTER NUMBER 1
THIRD RUN (RUN3) - FAILURES AND REPAIRS
THIRD EXAMPLE RUN - REPAIRS
RUN ID # 07/12/84 15.59.50.
*.

(((RANDOM NUMBER SEEDS AT START = 1999. 2999. 3999. 4999. 5999.)))

EVENT	TIME	EVENT TYPE	OPERANT CHAINS	WPN TYPE/ RECUPTIME	NO.RNDS/ +/- RAM	DGZ/TLE X	DGZ/TLE Y	DGZ/TLE Z	VOLLEY ANGLE	VOLLEY LENGTH	JEVNT		
1	0.00	INITIAL	1	INF.							0	0	0
2	0.00	USER RCNST	1								999	0	0
3	10.00	RCNSTITUTE	1	10.00							0	0	1
4	60.00	RCNSTITUTE	1	60.00							0	0	2
5	120.00	RCNSTITUTE	1	120.00							0	0	3
6	180.00	USER RCNST	1								999	0	0
7	190.00	RCNSTITUTE	1	190.00							0	0	1
8	240.00	RCNSTITUTE	1	240.00							0	0	2
9	300.00	RCNSTITUTE	1	300.00							0	0	3
10	360.00	USER RCNST	1								999	0	0
11	370.00	RCNSTITUTE	1	370.00							0	0	1
12	420.00	RCNSTITUTE	1	420.00							0	0	2
13	480.00	RCNSTITUTE	1	480.00							0	0	3
14	540.00	USER RCNST	1								999	0	0
15	550.00	RCNSTITUTE	1	550.00							0	0	1
16	600.00	RCNSTITUTE	1	600.00							0	0	2
17	660.00	RCNSTITUTE	1	660.00							0	0	3
18	720.00	USER RCNST	1								999	0	0
19	730.00	RCNSTITUTE	1	730.00							0	0	1
20	780.00	RCNSTITUTE	1	780.00							0	0	2
21	840.00	RCNSTITUTE	1	840.00							0	0	3
22	900.00	USER RCNST	1								999	0	0
23	910.00	RCNSTITUTE	1	910.00							0	0	1
24	960.00	RCNSTITUTE	1	960.00							0	0	2
25	1020.00	RCNSTITUTE	1	1020.00							0	0	3
26	1080.00	USER RCNST	1								999	0	0
27	1090.00	RCNSTITUTE	1	1090.00							0	0	1
28	1140.00	RCNSTITUTE	1	1140.00							0	0	2
29	1200.00	RCNSTITUTE	1	1200.00							0	0	3
30	1260.00	USER RCNST	1								999	0	0
31	1270.00	RCNSTITUTE	1	1270.00							0	0	1
32	1320.00	RCNSTITUTE	1	1320.00							0	0	2
33	1380.00	RCNSTITUTE	1	1380.00							0	0	3
34	1440.00	RCNSTITUTE	1	1440.00							0	0	4

MISCELLANEOUS VALUES
....
NO. OF REPLICATIONS = 50
SIGNIFICANCE FOR SUBSTITUTION = .005
TIMES FOR INTERNAL RECONSTITUTION EVALUATION = 10.0 60.0 120.0 180.0

>>>>>>>> INCOMING FIRE DIRECTION (MEASURED CCW FROM THE TARGET X AXIS) IS 0.0 DEGREES <<<<<<<<
>>>>>>>> DOWN WIND DIRECTION (MEASURED CCW FROM THE TARGET X AXIS) IS 0.0 DEGREES <<<<<<<<

****

DETERMINISTIC LETHALITY. FRACTIONAL KILLS ARE ACCOUNTED

****

ID	VRS	IVL	CNTRU	PRSEC-MX/MN	GRNUL	EXPND RT	NO.	NAMES
1	1	-1		1.00/ 1.00	1.00		1.00	TRUCK, TRK
2	1	-1		1.00/ 1.00	1.00		1.00	FKLFT
3	1	-1		1.00/ 1.00	1.00		1.00	CRANE, TRK
4	1	-1		1.00/ 1.00	1.00		1.00	RADIO, TALKY
5	0	-1		1.00/ 1.00	1.00		2.00	ALARM, TALKY
6	1	-1		1.00/ 1.00	1.00		1.00	TELE, TALKY
7	5	0			1.00		1.00	R/T OP, PERSONNEL
8	8	0			1.00		1.00	LOADMSTR, PERSONNEL
9	5	0			1.00		1.00	DRIVER, PERSONNEL
10	5	0			1.00		6.00	MEN, PERSONNEL
11	7	0			1.00		1.00	FKLFT OP, PERSONNEL
12	7	0			1.00		1.00	CRANE OP, PERSONNEL
13	5	0			1.00		1.00	RIGGER, PERSONNEL
14	1	-1		1.00/ 1.00	1.00		100.00	PARTS

DEGRADATION BY MOPP AND TOXIC KILL CRITERIA
TOXIC TRANSMISSION FACTORS

TOXIC K.C.	CODE	DOSE MULT	0 MOPP 0	1 MOPP I	2 MOPP II	3 MOPP III	4 MOPP IV
DEFALT MAN	1	1.00	1.00	.90	.70	.50	.25
	2	-1.00	1.00	****	****	****	****
	3	-1.00	1.00	****	****	****	****
	4	-1.00	1.00	****	****	****	****
	5	-1.00	1.00	****	****	****	****
TRANSMISSION FACTORS			1.00	1.00	1.00	.50	0.00

REPAIRABLE ITEM DATA

ID		DAMAGE	PENALTY	MEAN TIME	STD.DEV.	REPAIR	LOCATION	REPAIR LINK
2	FKLFT	LIGHT	1.000	120.000	50.000	10.000	10.000	*3
2	FKLFT	MEDIUM	1.000	360.000	100.000	10.000	10.000	*3
3	CRANE	LIGHT	1.000	120.000	50.000	10.000	10.000	*3
3	CRANE	MEDIUM	1.000	360.000	100.000	10.000	10.000	*3

RELIABILITY-TYPE FAILURES

ID		MTBTF	LITE	MED.
2	FKLFT	720.000	.800	.100
3	CRANE	1080.000	.800	.100

LINKS

LNK	NAME	HOME ID	INLNK	MAX IN	MAX EFF(%)	MIN IN	MIN EFF(%)	MAX INLINK	ASSOCIATED LINK	DGR SET
1	HANDLOAD	0	-5.00	5.00	65	1.00	0	UNLMTD	NONE	0

2	REPAIR	0	-2.00	2.00	100	0.00	0	UNLMTD	NONE	0	
3	DRIVER	4	1.00	1.00	100	0.00	0	1.00	TRUCK	0	
4	RADIO	4	1.00	1.00	100	0.00	0	UNLMTD	NONE		
5	TELE	6	1.00	1.00	100	0.00	0	UNLMTD	NONE		
6	TRUCK	1	1.00	1.00	100	0.00	0	UNLMTD	NONE		
7	CRANE OP	12	1.00	1.00	100	0.00	0	1.00	CRANE	0	
8	RIGGER	13	1.00	1.00	100	0.00	0	UNLMTD	NONE	0	
9	R/T OP	7	1.00	1.00	100	0.00	0	1.00	NONE	0	
10	FKLFT	2	1.00	1.00	100	0.00	0	UNLMTD	NONE		
11	CRANE	3	1.00	1.00	100	0.00	0	UNLMTD	NONE		
12	FKLFT OP	11	1.00	1.00	100	0.00	0	1.00	FKLFT	0	
13	LOADMSTR	8	1.00	1.00	100	0.00	75	2.00	NONE	0	
14	PARTS	14	100.00	1.00	100	0.00	0	UNLMTD	NONE	< EXPENDIBLE >	
95	NOT IN LINK		8.00								

LNKFG

KEY: SUBST. TIME/SUBST. EFFECTIVENESS/SUBST. ORDER-READ-IN

ASSET	1 HANDLOAD	2 REPAIR	3 DRIVER	4 RADIO	5 TELE	6 TRUCK	7 CRANE OP	8 RIGGER	9 R/T OP	10 FKLFT	11 CRANE	12 FKLFT OP
1 TRUCK	>					H						
2 FKLFT	>									H		
3 CRANE	>										H	
4 RADIO	>			H								
5 ALARM	>											
6 TELE	>				H							
7 R/T OP	> 5/1.0/1		15/.85/1					5/.60/1	H			5/.20/3
8 LOADMSTR	> 5/1.0/1	15/1.0/1	15/.85/1				5/1.0/3	5/.60/1	20/1.0/1			5/1.0/2
9 DRIVER	> 5/1.0/1		H					5/.60/1	15/.80/2			5/.20/3
10 MEN	> 5/1.0/1		15/.85/1					5/.60/1	15/.80/2			5/.20/3
11 FKLFT OP	> 5/1.0/1	10/1.0/3	15/.85/1				10/.80/1	5/.60/1	15/.80/2			H
12 CRANE OP	> 5/1.0/1	15/1.0/2	15/.85/1				H	5/.60/1	15/.80/2			10/.90/1
13 RIGGER	> 5/1.0/1		15/.85/1				5/.50/2	H	15/.80/2			5/.20/3
14 PARTS	>											

ASSET	13 LOADMSTR	14 PARTS	95 NOLINK
1 TRUCK	>		
2 FKLFT	>		
3 CRANE	>		
4 RADIO	>		
5 ALARM	>		H
6 TELE	>		
7 R/T OP	>		
8 LOADMSTR	> H		
9 DRIVER	>		
10 MEN	>		H
11 FKLFT OP	>		
12 CRANE OP	>		
13 RIGGER	>		
14 PARTS	>	H	

LINKS IN EACH SUBCHAIN
****

SUBCHAIN	LINKS		
*1	10	12	
*2	11	7	8
*3	2	14	

BRANCHES IN EACH ORLINK
++++++++++

ORLINK	BRANCHES	
+1	4	5
+2	*1	1

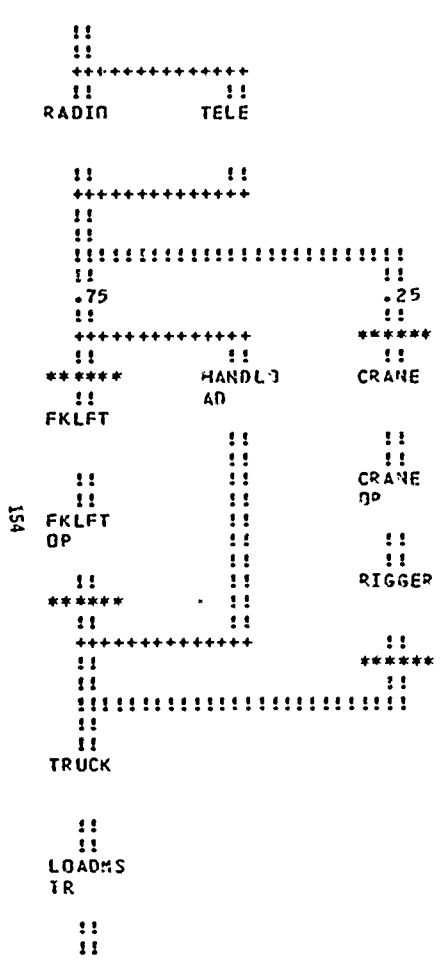
COMPOUND (CP) LINKS
****

CP LINK	CP PARTS	
!LOADING TECHNIQUE	+2 (.75)	*2 (.25)

SEGMENTS IN EACH CHAIN
****

SEG \	CHAINS 1
1	R/T DP
2	+1
3	!LOADING TECHNIQUE
4	TRUCK
5	LOADMSTR

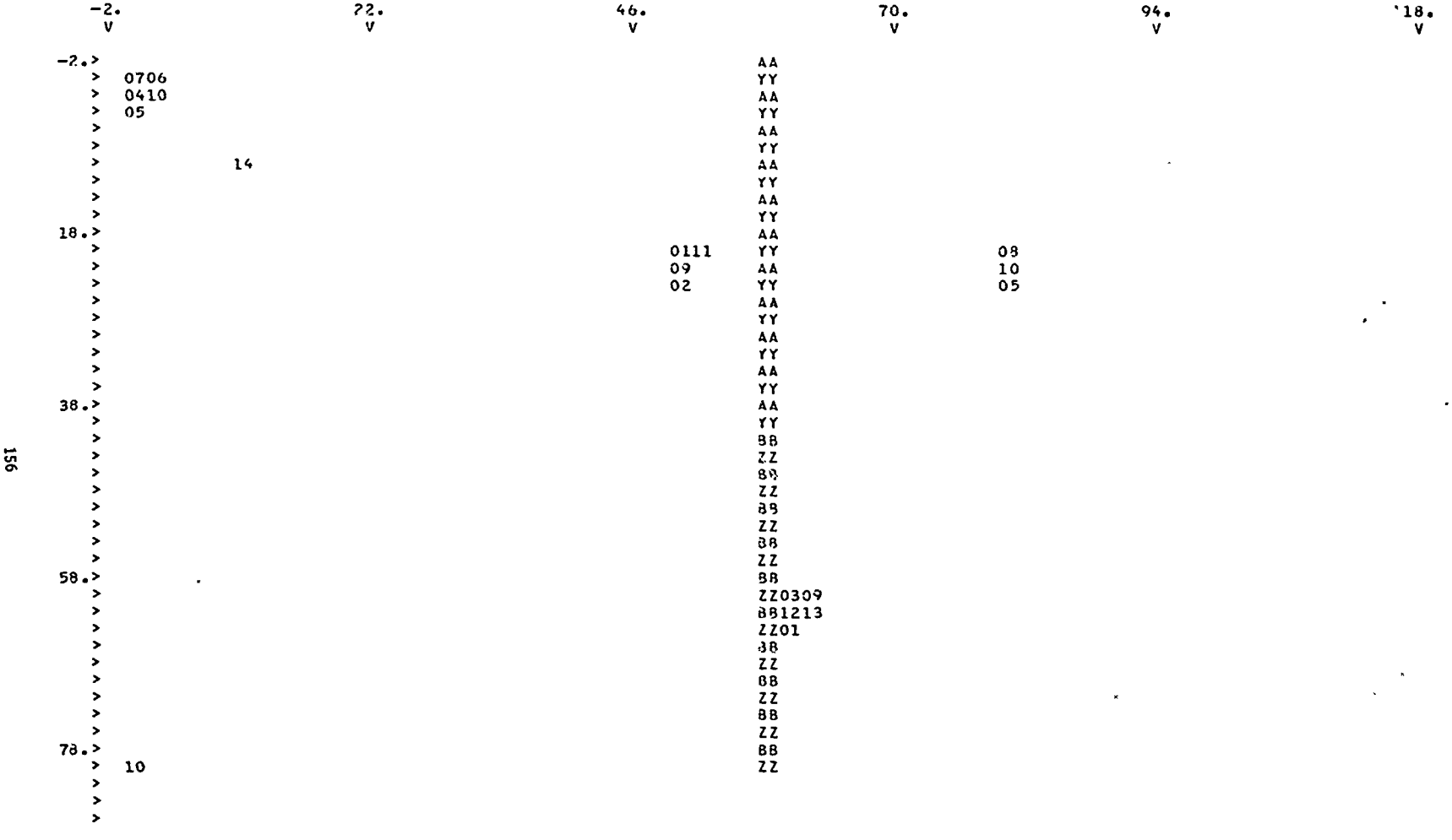
*** PLOT OF CHAIN # 1 OPERANT TIMES:(0.00 - INF.)



DEPLOYMENT
****** ***

	ID	ASSET	LNK	XTAR	YTAR	HOWMNY	KCAT	NKCAT	TKCAT	PSYR	NUCVR	MOPP
1	7	R/T OP	9	0.0	0.0	1.00	1	1	2	1	1	0
2	4	RADIO	4	0.0	0.0	1.00	1	1	1	1	1	0
3	5	ALARM	95	0.0	0.0	1.00	1	1	1	1	1	0
4	6	TELE	5	0.0	0.0	1.00	1	1	1	1	1	0
5	10	MEN	95	0.0	1.0	2.00	1	1	1	1	1	1
6	1	TRUCK	6	20.0	50.0	.60	1	1	1	1	1	0
7	9	DRIVER	3	20.0	50.0	.60	1	1	3	1	1	0
8	2	FKLFT	10	20.0	50.0	1.00	1	1	1	1	1	0
9	11	FKLFT OP	12	20.0	50.0	1.00	1	1	3	1	1	0
10	0	HANDLOAD	1	20.0	50.0	-5.00	1	1	4	1	1	0
11	8	LOADMSTR	13	20.0	80.0	1.00	1	1	5	1	1	0
12	10	MEN	95	20.0	80.0	2.00	1	1	1	1	1	1
13	5	ALARM	95	20.0	80.0	1.00	1	1	1	1	1	0
14	3	CRANE	11	60.0	60.0	1.00	1	1	1	1	1	0
15	12	CRANE OP	7	60.0	60.0	1.00	1	1	3	1	1	0
16	1	TRUCK	6	60.0	60.0	.40	1	1	1	1	1	0
17	9	DRIVER	3	60.0	60.0	.40	1	1	3	1	1	0
18	13	RIGGER	8	60.0	60.0	1.00	1	1	4	1	1	0
19	10	MEN	95	80.0	0.0	2.00	1	1	1	1	1	1
20	14	PARTS	14	10.0	10.0	100.00	1	1	1	1	1	0
21	0	REPAIR	2	10.0	10.0	-2.00	1	1	1	1	1	0

DEPLOYMENT Y (ACROSS) INTERVAL = X INTERVAL = 2. INITIAL INCOMING DIRECTION FROM AA TO BB DOWN WIND FROM YY TO ZZ



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^^^^^^ FINISHED INPUT AND INPUT CHECKS ^^^^^^
%%TIMER%%  CPUTIM =      3.5111


 <***> BEGINNING REPLICATION    1.   RND. NO. SEEDS =        1999.       2999.       3999.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.     8 HAD A LITE FAILURE AT TIME   120.00  <<<

%%TIMER%%  FINISHED REPLIC.   1. CPUTIM=      3.746.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION    2.   RND. NO. SEEDS =        1999.       2999. 1805188995.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.     8 HAD A LITE FAILURE AT TIME   120.00  <<<

%%TIMER%%  FINISHED REPLIC.   2. CPUTIM=      3.981.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION    3.   RND. NO. SEEDS =        1999.       2999. 1810542418.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.     8 HAD A LITE FAILURE AT TIME   120.00  <<<
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.     8 HAD A LITE FAILURE AT TIME  1080.00  <<<
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.    14 HAD A LITE FAILURE AT TIME  1200.00  <<<

%%TIMER%%  FINISHED REPLIC.   3. CPUTIM=      4.280.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION    4.   RND. NO. SEEDS =        1999.       2999. 1497060022.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   3 AT TGT. PT.    14 HAD A LITE FAILURE AT TIME   540.00  <<<
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.     8 HAD A LITE FAILURE AT TIME   840.00  <<<

%%TIMER%%  FINISHED REPLIC.   4. CPUTIM=      4.536.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION    5.   RND. NO. SEEDS =        1999.       2999.  670126151.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.     8 HAD A LITE FAILURE AT TIME   120.00  <<<
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```
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A LITE FAILURE AT TIME   960.00  <<<
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   14 HAD A MED  FAILURE AT TIME  1140.00  <<<

%%TIMER%%  FINISHED REPLIC.   5. CPUTIM=     4.831.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION    6.   RND. NO. SEEDS =        1999.       2999. 1124268690.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    3 HAD A DEAD FAILURE AT TIME   660.00  <<<
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   14 HAD A LITE FAILURE AT TIME   960.00  <<<

%%TIMER%%  FINISHED REPLIC.   6. CPUTIM=     5.133.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION    7.   RND. NO. SEEDS =        1999.       2999.  749783280.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A LITE FAILURE AT TIME   730.00  <<<
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   14 HAD A LITE FAILURE AT TIME  1020.00  <<<

%%TIMER%%  FINISHED REPLIC.   7. CPUTIM=     5.390.  TOP OF MEMORY ( ITOP ) =  52533
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 <***> BEGINNING REPLICATION    8.   RND. NO. SEEDS =        1999.       2999.  245050230.       4999.       5999. <***>


%%TIMER%%  FINISHED REPLIC.   8. CPUTIM=     5.603.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION    9.   RND. NO. SEEDS =        1999.       2999. 2082820840.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    3 HAD A LITE FAILURE AT TIME   190.00  <<<
>>>       .081 UNIT FROM ID   2 AT TGT. PT.    8 HAD A LITE FAILURE AT TIME   300.00  <<<
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A LITE FAILURE AT TIME   660.00  <<<
>>>       .500 UNIT FROM ID   2 AT TGT. PT.    8 HAD A LITE FAILURE AT TIME   840.00  <<<

%%TIMER%%  FINISHED REPLIC.   9. CPUTIM=     5.890.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION   10.   RND. NO. SEEDS =        1999.       2999. 2004474919.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   14 HAD A MED  FAILURE AT TIME   660.00  <<<
>>>       .273 UNIT FROM ID   3 AT TGT. PT.   14 HAD A DEAD FAILURE AT TIME  1020.00  <<<

%%TIMER%%  FINISHED REPLIC.  10. CPUTIM=     6.153.  TOP OF MEMORY ( ITOP ) =  52533
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 <***> BEGINNING REPLICATION   11.   RND. NO. SEEDS =        1999.       2999. 1964412802.       4999.       5999. <***>


%%TIMER%%  FINISHED REPLIC.  11. CPUTIM=     6.366.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION   12.   RND. NO. SEEDS =        1999.       2999.  795210520.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   14 HAD A LITE FAILURE AT TIME   180.00  <<<
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A LITE FAILURE AT TIME   300.00  <<<
>>>       .903 UNIT FROM ID   2 AT TGT. PT.    8 HAD A LITE FAILURE AT TIME   660.00  <<<

%%TIMER%%  FINISHED REPLIC.  12. CPUTIM=     6.672.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION   13.   RND. NO. SEEDS =        1999.       2999. 1179365831.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A LITE FAILURE AT TIME   660.00  <<<
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   14 HAD A LITE FAILURE AT TIME   960.00  <<<
>>>       .885 UNIT FROM ID   3 AT TGT. PT.   14 HAD A LITE FAILURE AT TIME  1200.00  <<<
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A MED  FAILURE AT TIME  1260.00  <<<
>>>       .558 UNIT FROM ID   3 AT TGT. PT.   14 HAD A LITE FAILURE AT TIME  1380.00  <<<

%%TIMER%%  FINISHED REPLIC.  13. CPUTIM=     6.996.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION   14.   RND. NO. SEEDS =        1999.       2999.  185782340.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A LITE FAILURE AT TIME  1140.00  <<<

%%TIMER%%  FINISHED REPLIC.  14. CPUTIM=     7.231.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION   15.   RND. NO. SEEDS =        1999.       2999.  303432094.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A MED  FAILURE AT TIME   120.00  <<<
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A LITE FAILURE AT TIME  1020.00  <<<

%%TIMER%%  FINISHED REPLIC.  15. CPUTIM=     7.523.  TOP OF MEMORY ( ITOP ) =  52533
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 <***> BEGINNING REPLICATION   16.   RND. NO. SEEDS =        1999.       2999.  887665568.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A DEAD FAILURE AT TIME   660.00  <<<
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   14 HAD A LITE FAILURE AT TIME  1080.00  <<<

%%TIMER%%  FINISHED REPLIC.  16. CPUTIM=     7.836.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION   17.   RND. NO. SEEDS =        1999.       2999.  945264352.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A LITE FAILURE AT TIME   540.00  <<<
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   14 HAD A MED  FAILURE AT TIME   660.00  <<<

%%TIMER%%  FINISHED REPLIC.  17. CPUTIM=     8.192.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION   18.   RND. NO. SEEDS =        1999.       2999. 1224942675.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   14 HAD A LITE FAILURE AT TIME   660.00  <<<
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A LITE FAILURE AT TIME  1080.00  <<<

%%TIMER%%  FINISHED REPLIC.  18. CPUTIM=     8.448.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION   19.   RND. NO. SEEDS =        1999.       2999. 1831217830.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A DEAD FAILURE AT TIME   420.00  <<<

%%TIMER%%  FINISHED REPLIC.  19. CPUTIM=     8.736.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION   20.   RND. NO. SEEDS =        1999.       2999. 1395710225.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A DEAD FAILURE AT TIME   660.00  <<<

%%TIMER%%  FINISHED REPLIC.  20. CPUTIM=     9.007.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION   21.   RND. NO. SEEDS =        1999.       2999. 1996409884.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A LITE FAILURE AT TIME   180.00  <<<
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>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   14 HAD A LITE FAILURE AT TIME   780.00  <<<

%%TIMER%%  FINISHED REPLIC.  21. CPUTIM=     9.263.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION   22.   RND. NO. SEEDS =        1999.       2999.  117254115.       4999.       5999. <***>


%%TIMER%%  FINISHED REPLIC.  22. CPUTIM=     9.477.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION   23.   RND. NO. SEEDS =        1999.       2999.  324718067.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A LITE FAILURE AT TIME   240.00  <<<
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   14 HAD A LITE FAILURE AT TIME   300.00  <<<

%%TIMER%%  FINISHED REPLIC.  23. CPUTIM=     9.898.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION   24.   RND. NO. SEEDS =        1999.       2999. 1675085826.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   14 HAD A LITE FAILURE AT TIME  1140.00  <<<
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A LITE FAILURE AT TIME  1380.00  <<<

%%TIMER%%  FINISHED REPLIC.  24. CPUTIM=    10.143.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION   25.   RND. NO. SEEDS =        1999.       2999. 1263529144.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   14 HAD A LITE FAILURE AT TIME   900.00  <<<
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A LITE FAILURE AT TIME  1320.00  <<<

%%TIMER%%  FINISHED REPLIC.  25. CPUTIM=    10.391.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION   26.   RND. NO. SEEDS =        1999.       2999. 1220726318.       4999.       5999. <***>


%%TIMER%%  FINISHED REPLIC.  26. CPUTIM=    10.604.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION   27.   RND. NO. SEEDS =        1999.       2999. 1806678964.       4999.       5999. <***>
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 %%TIMER%%  FINISHED REPLIC.  27. CPUTIM=    10.813.  TOP OF MEMORY ( ITOP ) =  52533


  <***> BEGINNING REPLICATION   28.   RND. NO. SEEDS =        1999.       2999.  496868843.       4999.       5999. <***>

 >>>      1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A LITE FAILURE AT TIME  1260.00  <<<
 %%TIMER%%  FINISHED REPLIC.  28. CPUTIM=    11.054.  TOP OF MEMORY ( ITOP ) =  52533


  <***> BEGINNING REPLICATION   29.   RND. NO. SEEDS =        1999.       2999. 2133290449.       4999.       5999. <***>

 >>>      1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A MED  FAILURE AT TIME  1080.00  <<<
 %%TIMER%%  FINISHED REPLIC.  29. CPUTIM=    11.303.  TOP OF MEMORY ( ITOP ) =  52533


  <***> BEGINNING REPLICATION   30.   RND. NO. SEEDS =        1999.       2999. 2092020653.       4999.       5999. <***>

 >>>      1.000 UNIT FROM ID   2 AT TGT. PT.    5 HAD A DEAD FAILURE AT TIME   900.00  <<<
 %%TIMER%%  FINISHED REPLIC.  30. CPUTIM=    11.557.  TOP OF MEMORY ( ITOP ) =  52533


  <***> BEGINNING REPLICATION   31.   RND. NO. SEEDS =        1999.       2999. 1759266249.       4999.       5999. <***>


 %%TIMER%%  FINISHED REPLIC.  31. CPUTIM=    11.771.  TOP OF MEMORY ( ITOP ) =  52533


  <***> BEGINNING REPLICATION   32.   RND. NO. SEEDS =        1999.       2999. 1267681699.       4999.       5999. <***>

 >>>      1.000 UNIT FROM ID   3 AT TGT. PT.   14 HAD A DEAD FAILURE AT TIME   300.00  <<<
 >>>      1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A LITE FAILURE AT TIME   720.00  <<<
 >>>      1.000 UNIT FROM ID   2 AT TGT. PT.    9 HAD A LITE FAILURE AT TIME  1020.00  <<<
 %%TIMER%%  FINISHED REPLIC.  32. CPUTIM=    12.021.  TOP OF MEMORY ( ITOP ) =  52533
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 <***> BEGINNING REPLICATION   33.   RND. NO. SEEDS =        1999.       2999. 1003989602.       4999.       5999. <***>


>>>       1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A DEAD FAILURE AT TIME   180.00  <<<

%%TIMER%%  FINISHED REPLIC.  33. CPUTIM=    12.325.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION   34.   RND. NO. SEEDS =        1999.       2999. 2025680662.       4999.       5999. <***>


>>>       1.000 UNIT FROM ID   3 AT TGT. PT.   14 HAD A LITE FAILURE AT TIME   420.00  <<<
>>>       1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A DEAD FAILURE AT TIME   900.00  <<<

%%TIMER%%  FINISHED REPLIC.  34. CPUTIM=    12.600.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION   35.   RND. NO. SEEDS =        1999.       2999. 1954160732.       4999.       5999. <***>


>>>       1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A MED  FAILURE AT TIME   120.00  <<<
>>>       1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A LITE FAILURE AT TIME  1270.00  <<<

%%TIMER%%  FINISHED REPLIC.  35. CPUTIM=    12.893.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION   36.   RND. NO. SEEDS =        1999.       2999. 1447173834.       4999.       5999. <***>


>>>       1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A LITE FAILURE AT TIME   720.00  <<<
>>>       1.000 UNIT FROM ID   3 AT TGT. PT.   14 HAD A LITE FAILURE AT TIME  1380.00  <<<

%%TIMER%%  FINISHED REPLIC.  36. CPUTIM=    13.139.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION   37.   RND. NO. SEEDS =        1999.       2999. 1409293685.       4999.       5999. <***>


>>>       1.000 UNIT FROM ID   3 AT TGT. PT.   14 HAD A LITE FAILURE AT TIME  1080.00  <<<

%%TIMER%%  FINISHED REPLIC.  37. CPUTIM=    13.373.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION   38.   RND. NO. SEEDS =        1999.       2999.  294893096.       4999.       5999. <***>


>>>       1.000 UNIT FROM ID   3 AT TGT. PT.   14 HAD A LITE FAILURE AT TIME   600.00  <<<
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```
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    6 HAD A LITE FAILURE AT TIME   840.00  <<<
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A LITE FAILURE AT TIME  1270.00  <<<

%%TIMER%%  FINISHED REPLIC.  38. CPUTIM=    13.651.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION   39.   RND. NO. SEEDS =        1999.       2999.  733845569.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   14 HAD A LITE FAILURE AT TIME   420.00  <<<
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    6 HAD A MED  FAILURE AT TIME   900.00  <<<
>>>       .241 UNIT FROM ID   2 AT TGT. PT.    8 HAD A DEAD FAILURE AT TIME  1260.00  <<<

%%TIMER%%  FINISHED REPLIC.  39. CPUTIM=    13.932.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION   40.   RND. NO. SEEDS =        1999.       2999. 1158764627.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    6 HAD A LITE FAILURE AT TIME  1260.00  <<<
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   14 HAD A LITE FAILURE AT TIME  1260.00  <<<

%%TIMER%%  FINISHED REPLIC.  40. CPUTIM=    14.209.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION   41.   RND. NO. SEEDS =        1999.       2999. 1539678450.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   14 HAD A MED  FAILURE AT TIME   780.00  <<<
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A MED  FAILURE AT TIME   960.00  <<<
>>>       .026 UNIT FROM ID   2 AT TGT. PT.    8 HAD A LITE FAILURE AT TIME  1320.00  <<<

%%TIMER%%  FINISHED REPLIC.  41. CPUTIM=    14.552.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION   42.   RND. NO. SEEDS =        1999.       2999. 1307283016.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    6 HAD A LITE FAILURE AT TIME   180.00  <<<
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   14 HAD A LITE FAILURE AT TIME   240.00  <<<
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A MED  FAILURE AT TIME   840.00  <<<
>>>       .034 UNIT FROM ID   2 AT TGT. PT.    8 HAD A LITE FAILURE AT TIME  1080.00  <<<

%%TIMER%%  FINISHED REPLIC.  42. CPUTIM=    14.899.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION   43.   RND. NO. SEEDS =        1999.       2999.  585933024.       4999.       5999. <***>
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```
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   14 HAD A LITE FAILURE AT TIME   300.00  <<<
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A MED  FAILURE AT TIME   960.00  <<<
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   14 HAD A DEAD FAILURE AT TIME  1200.00  <<<

%%TIMER%%  FINISHED REPLIC.  43. CPUTIM=    15.182.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION   44.   RND. NO. SEEDS =        1999.       2999. 1048203200.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A DEAD FAILURE AT TIME   300.00  <<<
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   14 HAD A MED  FAILURE AT TIME  1200.00  <<<

%%TIMER%%  FINISHED REPLIC.  44. CPUTIM=    15.524.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION   45.   RND. NO. SEEDS =        1999.       2999. 1935924798.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   14 HAD A LITE FAILURE AT TIME   120.00  <<<
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A LITE FAILURE AT TIME   540.00  <<<
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   14 HAD A LITE FAILURE AT TIME   900.00  <<<

%%TIMER%%  FINISHED REPLIC.  45. CPUTIM=    15.801.  TOP OF MEMORY ( ITOP ) =  52533

165

 <***> BEGINNING REPLICATION   46.   RND. NO. SEEDS =        1999.       2999. 1091677898.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A LITE FAILURE AT TIME   600.00  <<<
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A LITE FAILURE AT TIME   900.00  <<<

%%TIMER%%  FINISHED REPLIC.  46. CPUTIM=    16.059.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION   47.   RND. NO. SEEDS =        1999.       2999.  213040697.       4999.       5999. <***>


%%TIMER%%  FINISHED REPLIC.  47. CPUTIM=    16.272.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION   48.   RND. NO. SEEDS =        1999.       2999. 2026083113.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   14 HAD A LITE FAILURE AT TIME    60.00  <<<
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A LITE FAILURE AT TIME   240.00  <<<
>>>       .203 UNIT FROM ID   2 AT TGT. PT.    8 HAD A LITE FAILURE AT TIME   420.00  <<<
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   14 HAD A LITE FAILURE AT TIME  1440.00  <<<
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```
ZZTIMERZZ  FINISHED REPLIC.  48. CPUTIM=    16.573.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION   49.   RND. NO. SEEDS =        1999.       2999.  402750080.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   14 HAD A LITE FAILURE AT TIME   180.00  <<<
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A LITE FAILURE AT TIME   240.00  <<<
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A LITE FAILURE AT TIME  1020.00  <<<

ZZTIMERZZ  FINISHED REPLIC.  49. CPUTIM=    16.888.  TOP OF MEMORY ( ITOP ) =  52533


 <***> BEGINNING REPLICATION   50.   RND. NO. SEEDS =        1999.       2999. 2013739972.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.    8 HAD A LITE FAILURE AT TIME   720.00  <<<
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   14 HAD A LITE FAILURE AT TIME   900.00  <<<
>>>       .917 UNIT FROM ID   2 AT TGT. PT.    9 HAD A LITE FAILURE AT TIME  1320.00  <<<

ZZTIMERZZ  FINISHED REPLIC.  50. CPUTIM=    17.232.  TOP OF MEMORY ( ITOP ) =  52533
```

ENCOUNTER RESULTS - AVERAGED OVER 50 REPLICATIONS
****

THIRD RUN (RUN3) - FAILURES AND REPAIRS
THIRD EXAMPLE RUN - REPAIRS
RUN ID # 07/12/84 15.59.50.

**** REPEAT OF WARNINGS FROM THIS RUN ****
****

!!* WARNING *!*!* CAN NOT FIND ASSET OR LINK NAMED HANDLOAD DUMMY LINK CREATED

!!* WARNING *!*!* CAN NOT FIND ASSET OR LINK NAMED REPAIR DUMMY LINK CREATED

*** WARNING *** LINK HANDLOAD HAS NO CORRESPONDINGLY NAMED ASSET - ASSUMING DUMMY LINK

*** WARNING *** LINK REPAIR HAS NO CORRESPONDINGLY NAMED ASSET - ASSUMING DUMMY LINK
****

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*** EFFECTIVENESS VS. TIME ***
****

FREQUENCY DISTRIBUTION OF RESULTS
****

TIME	EFFECTIVENESS	OPP CHNS	100	90-99	80-89	70-79	60-69	50-59	40-49	30-39	20-29	10-19	1-9	0
0.00	1.00 +/- .000	1	50	0	0	0	0	0	0	0	0	0	0	0
10.00	1.00 +/- .000	1	50	0	0	0	0	0	0	0	0	0	0	0
60.00	1.00 +/- .005	1	49	0	0	1	0	0	0	0	0	0	0	0
120.00	.96 +/- .014	1	42	0	0	8	0	0	0	0	0	0	0	0
190.00	.93 +/- .017	1	36	0	0	14	0	0	0	0	0	0	0	0
240.00	.91 +/- .020	1	35	0	0	13	0	1	1	0	0	0	0	0
300.00	.89 +/- .022	1	32	0	0	14	0	3	1	0	0	0	0	0
370.00	.92 +/- .019	1	37	0	0	11	1	1	0	0	0	0	0	0
420.00	.92 +/- .017	1	35	0	0	14	1	0	0	0	0	0	0	0
480.00	.92 +/- .018	1	35	0	0	13	2	0	0	0	0	0	0	0
550.00	.91 +/- .020	1	34	0	0	12	4	0	0	0	0	0	0	0
600.00	.91 +/- .018	1	32	0	0	18	0	0	0	0	0	0	0	0
660.00	.88 +/- .020	1	28	0	0	20	1	0	1	0	0	0	0	0
730.00	.88 +/- .020	1	29	0	0	18	0	0	1	0	0	0	0	0
780.00	.88 +/- .020	1	29	0	0	19	1	0	1	0	0	0	0	0
840.00	.88 +/- .020	1	28	0	0	20	1	0	1	0	0	0	0	0
910.00	.87 +/- .019	1	25	0	0	23	2	0	0	0	0	0	0	0
960.00	.85 +/- .021	1	24	0	0	23	1	1	1	0	0	0	0	0
1020.00	.84 +/- .022	1	22	0	0	23	2	2	1	0	0	0	0	0
1090.00	.83 +/- .022	1	21	0	0	25	1	1	2	0	0	0	0	0
1140.00	.84 +/- .021	1	22	0	0	24	2	1	1	0	0	0	0	0
1200.00	.84 +/- .023	1	22	1	0	20	4	0	3	0	0	0	0	0
1270.00	.83 +/- .023	1	21	1	0	20	4	1	3	0	0	0	0	0
1320.00	.84 +/- .023	1	22	1	0	21	2	2	2	0	0	0	0	0
1380.00	.84 +/- .022	1	22	1	0	21	2	3	1	0	0	0	0	0
1440.00	.85 +/- .021	1	22	1	1	21	4	1	0	0	0	0	0	0

##########

```
ASSET SURVIVORS - INCLUDING CONTAMINATED - VS. TIME FOR REPLICATION    0
*****************************************************************************************

       .TRUCK .FKLFT .CRANE .RADIO .ALARM .TELE  .R/T OP.LOADMS.DRIVER.MEN    .FKLFT .CRANE .RIGGER.PARTS .
       .      .      .      .      .      .      .      .TR    .      .      .OP    .OP    .      .      .
       .      .      .      .      .      .      .      .      .      .      .      .      .      .      .
  TIME .    1 .    2 .    3 .    4 .    5 .    6 .    7 .    8 .    9 .   10 .   11 .   12 .   13 .   14 .
..........................................................................................................
   0.00   1.00   1.00   1.00   1.00   2.00   1.00   1.00   1.00   1.00   6.00   1.00   1.00   1.00 100.00
  10.00   1.00   1.00   1.00   1.00   2.00   1.00   1.00   1.00   1.00   6.00   1.00   1.00   1.00 100.00
  60.00   1.00   1.00    .98   1.00   2.00   1.00   1.00   1.00   1.00   6.00   1.00   1.00   1.00 100.00
 120.00   1.00    .88    .96   1.00   2.00   1.00   1.00   1.00   1.00   6.00   1.00   1.00   1.00 100.00
 190.00   1.00    .81    .93   1.00   2.00   1.00   1.00   1.00   1.00   6.00   1.00   1.00   1.00  99.97
 240.00   1.00    .79    .93   1.00   2.00   1.00   1.00   1.00   1.00   6.00   1.00   1.00   1.00  99.92
 300.00   1.00    .80    .90   1.00   2.00   1.00   1.00   1.00   1.00   6.00   1.00   1.00   1.00  99.84
 370.00   1.00    .85    .93   1.00   2.00   1.00   1.00   1.00   1.00   6.00   1.00   1.00   1.00  99.76
 420.00   1.00    .85    .91   1.00   2.00   1.00   1.00   1.00   1.00   6.00   1.00   1.00   1.00  99.71
 480.00   1.00    .88    .92   1.00   2.00   1.00   1.00   1.00   1.00   6.00   1.00   1.00   1.00  99.67
 550.00   1.00    .87    .93   1.00   2.00   1.00   1.00   1.00   1.00   6.00   1.00   1.00   1.00  99.62
 600.00   1.00    .87    .92   1.00   2.00   1.00   1.00   1.00   1.00   6.00   1.00   1.00   1.00  99.59
 660.00   1.00    .77    .88   1.00   2.00   1.00   1.00   1.00   1.00   6.00   1.00   1.00   1.00  99.54
 730.00   1.00    .73    .90   1.00   2.00   1.00   1.00   1.00   1.00   6.00   1.00   1.00   1.00  99.48
 780.00   1.00    .77    .88   1.00   2.00   1.00   1.00   1.00   1.00   6.00   1.00   1.00   1.00  99.43
 840.00   1.00    .75    .90   1.00   2.00   1.00   1.00   1.00   1.00   6.00   1.00   1.00   1.00  99.36
 910.00   1.00    .72    .86   1.00   2.00   1.00   1.00   1.00   1.00   6.00   1.00   1.00   1.00  99.29
 960.00   1.00    .68    .85   1.00   2.00   1.00   1.00   1.00   1.00   6.00   1.00   1.00   1.00  99.25
1020.00   1.00    .65    .83   1.00   2.00   1.00   1.00   1.00   1.00   6.00   1.00   1.00   1.00  99.19
1090.00   1.00    .64    .85   1.00   2.00   1.00   1.00   1.00   1.00   6.00   1.00   1.00   1.00  99.09
1140.00   1.00    .65    .84   1.00   2.00   1.00   1.00   1.00   1.00   6.00   1.00   1.00   1.00  99.02
1200.00   1.00    .70    .80   1.00   2.00   1.00   1.00   1.00   1.00   6.00   1.00   1.00   1.00  98.94
1270.00   1.00    .65    .82   1.00   2.00   1.00   1.00   1.00   1.00   6.00   1.00   1.00   1.00  98.85
1320.00   1.00    .63    .85   1.00   2.00   1.00   1.00   1.00   1.00   6.00   1.00   1.00   1.00  98.80
1380.00   1.00    .66    .84   1.00   2.00   1.00   1.00   1.00   1.00   6.00   1.00   1.00   1.00  98.73
1440.00   1.00    .71    .83   1.00   2.00   1.00   1.00   1.00   1.00   6.00   1.00   1.00   1.00  98.67

LINK RESULTS VS. TIME FOR REPLICATION    0

KEY: LINE1 = # OF ACTUAL USES ( INCL. = 0 IF NOT IN CPLNK )
     LINE2 = # OF TIMES WEAK BECAUSE ASSETS UNAVAILABLE
     LINE3 = # OF TIMES WEAK, LIMITED BY NO. ALLOWED IN LINK
     LINE4 = # OF TIMES = 0 IN COMPOUND LNK ( THUS NOT COUNTED IN LINE1 )
     LINE5 = # OF AS-AVAILABLE USES ( AS IN REPAIR )
     LINE6 = NO. TIMES LIMITING IN AS-AVAILABLE USES
*************************************************************
       .HANDLD.REPAIR.DRIVER.RADIO .TELE  .TRUCK .CRANE .RIGGER.R/T OP.FKLFT .CRANE .FKLFT .LOADMS.PARTS .
       .AD    .      .      .      .      .      .OP    .      .      .      .      .OP    .TR    .      .
       .      .      .      .      .      .      .      .      .      .      .      .      .      .      .
  TIME .    1 .    2 .    3 .    4 .    5 .    6 .    7 .    8 .    9 .   10 .   11 .   12 .   13 .   14 .
..........................................................................................................
   0.00 .    0      0      0     50      0     50     50     50     50     50     50     50     50      0
       .    0      0      0      0      0      0      0      0      0      0      0      0      0      0
       .    0      0      0      0      0      0      0      0      0      0      0      0      0      0
       .    0      0      0      0      0      0      0      0      0      0      0      0      0      0
       .    0      0      0      0      0      0      0      0      0      0      0      0      0      0
       .    0      0      0      0      0      0      0      0      0      0      0      0      0      0

  10.00 .    0      0      0     50      0     50     50     50     50     50     50     50     50      0
       .    0      0      0      0      0      0      0      0      0      0      0      0      0      0
       .    0      0      0      0      0      0      0      0      0      0      0      0      0      0
       .    0      0      0      0      0      0      0      0      0      0      0      0      0      0
       .    0      0      0      0      0      0      0      0      0      0      0      0      0      0
```

	.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
60.00	.	0	1	0	50	0	50	49	49	50	50	49	50	50	1
	.	0	0	0	0	0	0	0	0	0	0	0	0	1<<	0
	.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
120.00	.	6	2	0	50	0	50	48	48	50	44	48	44	50	2
	.	6<<	0	0	0	0	0	0	0	0	0	0	0	2<<	0
	.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	6	0	0	0	0	0	0	0	0	0	0	0	6
	.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
190.00	.	10	4	0	50	0	50	46	46	50	40	46	40	50	4
	.	10<<	0	0	0	0	0	0	0	0	0	0	0	4<<	0
	.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	9	0	0	0	0	0	0	0	0	0	0	0	9
	.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
240.00	.	13	5	0	50	0	50	47	47	50	37	47	37	50	5
	.	13<<	0	0	0	0	0	0	0	0	0	2<<	0	2<<	0
	.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	.	0	12	0	0	0	0	0	0	0	0	0	0	0	12
	.	0	3<<	0	0	0	0	0	0	0	0	0	0	0	0
300.00	.	11	10	0	50	0	50	46	46	50	39	46	39	50	10
	.	11<<	0	0	0	0	0	0	0	0	0	3<<	0	6<<	0
	.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	2<<	0	0	0
	.	0	9	0	0	0	0	0	0	0	0	0	0	0	9
	.	0	5<<	0	0	0	0	0	0	0	0	0	0	0	0
370.00	.	8	7	0	50	0	50	48	48	50	42	48	42	50	7
	.	8<<	0	0	0	0	0	1<<	0	0	2<<	4<<	0	2<<	0
	.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	.	0	7	0	0	0	0	0	0	0	0	0	0	0	7
	.	0	5<<	0	0	0	0	0	0	0	0	0	0	0	0
420.00	.	8	6	0	50	0	50	46	46	50	42	46	42	50	6
	.	8<<	0	0	0	0	0	0	0	0	2<<	2<<	0	4<<	0
	.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	.	0	7	0	0	0	0	0	0	0	0	0	0	0	7
	.	0	5<<	0	0	0	0	0	0	0	0	0	0	0	0
480.00	.	7	7	0	50	0	50	45	45	50	43	45	43	50	7
	.	7<<	1<<	0	0	0	0	0	0		1<<	1<<	0	3<<	0
	.	0	0	0	0	0	0	0	0		0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	.	0	6	0	0	0	0	0	0	0	0	0	0	0	6
	.	0	4<<	0	0	0	0	0	0	0	0	0	0	0	0
550.00	.	5	10	0	50	0	50	45	45	50	45	45	45	50	10
	.	5<<	4<<	0	0	0	0	1<<	0	0	2<<	1<<	0	4<<	0
	.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	.	0	2	0	0	0	0	0	0	0	0	0	0	0	2
	.	0	1<<	0	0	0	0	0	0	0	0	0	0	0	0

600.00	.	6	11	0	50	0	50	44	44	50	44	44	44	50	11
	.	5<<	0	0	0	0	0	1<<	0	0	2<<	1<<	0	9<<	0
	.	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	.	0	3	0	0	0	0	0	0	0	0	0	0	0	3
	.	0	1<<	0	0	0	0	0	0	0	0	0	0	0	0
660.00	.	12	10	0	50	0	50	[illegible]	43	50	38	43	38	50	10
	.	12<<	0	0	0	0	0	0	0	0	1<<	0	0	8<<	0
	.	0	0	0	0	0	0	1<<	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	2<<	0	0	0
	.	0	6	0	0	0	0	0	0	0	0	0	0	0	6
	.	0	2<<	0	0	0	0	0	0	0	0	0	0	0	0
730.00	.	14	7	0	50	0	50	44	44	50	36	44	36	50	7
	.	14<<	0	0	0	0	0	0	0	0	2<<	0	0	5<<	0
	.	0	0	0	0	0	0	1<<	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	2<<	0	0	0
	.	0	8	0	0	0	0	0	0	0	0	0	0	0	8
	.	0	2<<	0	0	0	0	0	0	0	0	0	0	0	0
780.00	.	13	8	0	50	0	50	44	44	50	37	44	37	50	8
	.	13<<	0	0	0	0	0	0	0	0	2<<	0	0	6<<	0
	.	0	0	0	0	0	0	2<<	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	.	0	7	0	0	0	0	0	0	0	0	0	0	0	7
	.	0	2<<	0	0	0	0	0	0	0	0	0	0	0	0
840.00	.	14	8	0	50	0	50	45	45	50	36	45	36	50	8
	.	14<<	0	0	0	0	0	0	0	0	2<<	0	0	6<<	0
	.	0	0	0	0	0	0	2<<	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	.	0	8	0	0	0	0	0	0	0	0	0	0	0	8
	.	0	3<<	0	0	0	0	0	0	0	0	0	0	0	0
910.00	.	14	11	0	50	0	50	43	43	50	36	43	36	50	11
	.	14<<	0	0	0	0	0	0	0	0	4<<	0	0	7<<	0
	.	0	0	0	0	0	0	2<<	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	2<<	0	0	0
	.	0	6	0	0	0	0	0	0	0	0	0	0	0	6
	.	0	3<<	0	0	0	0	0	0	0	0	0	0	0	0
960.00	.	17	10	0	50	0	50	43	43	50	33	43	33	50	10
	.	17<<	0	0	0	0	0	0	0	0	3<<	1<<	0	5<<	0
	.	0	0	0	0	0	0	3<<	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	2<<	0	0	0
	.	0	10	0	0	0	0	0	0	0	0	0	0	0	10
	.	0	4<<	0	0	0	0	0	0	0	0	0	0	0	0
1020.00	.	17	13	0	50	0	50	44	44	50	33	44	33	50	13
	.	17<<	1<<	0	0	0	0	0	0	0	3<<	2<<	0	7<<	0
	.	0	0	0	0	0	0	3<<	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	.	0	10	0	0	0	0	0	0	0	0	0	0	0	10
	.	0	5<<	0	0	0	0	0	0	0	0	0	0	0	0
1090.00	.	19	13	0	50	0	50	42	42	50	31	42	31	50	13
	.	19<<	0	0	0	0	0	0	0	0	2<<	2<<	0	8<<	0
	.	0	0	0	0	0	0	2<<	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	2<<	0	0	0
	.	0	13	0	0	0	0	0	0	0	0	0	0	0	13
	.	0	5<<	0	0	0	0	0	0	0	0	0	0	0	0

1140.00	.	19	11	0	50	0	50	43	43	50	31	43	31	50	11
	.	19<<	0	0	0	0	0	0	0	0	3<<	2<<	0	6<<	0
	.	0	0	0	0	0	0	2<<	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	2<<	0	0	0
	.	0	12	0	0	0	0	0	0	0	0	0	0	0	12
	.	0	6<<	0	0	0	0	0	0	0	0	0	0	0	0
1200.00	.	16	15	0	50	0	50	41	41	50	34	41	34	50	15
	.	16<<	0	0	0	0	0	0	0	0	3<<	3<<	0	8<<	0
	.	0	0	0	0	0	0	1<<	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	5<<	0	0	0
	.	0	10	0	0	0	0	0	0	0	0	0	0	0	10
	.	0	7<<	0	0	0	0	0	0	0	0	0	0	0	0
1270.00	.	18	14	0	50	0	50	43	43	50	32	43	32	50	14
	.	18<<	1<<	0	0	0	0	0	0	0	3<<	4<<	0	5<<	0
	.	0	0	0	0	0	0	2<<	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	5<<	0	0	0
	.	0	10	0	0	0	0	0	0	0	0	0	0	0	10
	.	0	8<<	0	0	0	0	0	0	0	0	0	0	0	0
1320.00	.	19	11	0	50	0	50	45	45	50	31	45	31	50	11
	.	19<<	0	0	0	0	0	0	0	0	2<<	4<<	0	5<<	0
	.	0	0	0	0	0	0	1<<	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	4<<	0	0	0
	.	0	13	0	0	0	0	0	0	0	0	0	0	0	13
	.	0	8<<	0	0	0	0	0	0	0	0	0	0	0	0
1380.00	.	19	11	0	50	0	50	46	46	50	31	46	31	50	11
	.	19<<	0	0	0	0	0	0	0	0	3<<	5<<	0	4<<	0
	.	0	0	0	0	0	0	1<<	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	3<<	0	0	0
	.	0	12	0	0	0	0	0	0	0	0	0	0	0	12
	.	0	8<<	0	0	0	0	0	0	0	0	0	0	0	0
1440.00	.	15	14	0	50	0	50	45	45	50	35	45	35	50	14
	.	15<<	0	0	0	0	0	0	0	0	4<<	5<<	0	7<<	0
	.	0	0	0	0	0	0	1<<	0	0	0	0	0	0	0
	.	0	0	0	0	0	0	0	0	0	0	3<<	0	0	0
	.	0	7	0	0	0	0	0	0	0	0	0	0	0	7
	.	0	8<<	0	0	0	0	0	0	0	0	0	0	0	0

COMPOUND LINK PARTS VS. TIME
****

AVERAGE EFFECTIVENESS USED, OVER ALL REPLICATIONS
(NOTE: IF CPL NOT WEAK, MORE CAPABILITY MAY HAVE BEEN AVAILABLE THAN WAS USED)

TIME	. 1	. 2	.
0.00	1.00	1.00	
10.00	1.00	1.00	
60.00	1.00	.98	
120.00	.96	.96	
190.00	.93	.92	
240.00	.91	.92	
300.00	.91	.84	
370.00	.93	.91	
420.00	.93	.89	
460.00	.94	.88	
550.00	.94	.88	
600.00	.94	.82	
660.00	.91	.82	

730.00	.89	.86
780.00	.90	.84
840.00	.89	.85
910.00	.89	.81
960.00	.87	.79
1020.00	.86	.78
1090.00	.86	.77
1140.00	.86	.79
1200.00	.87	.74
1270.00	.86	.76
1320.00	.85	.79
1380.00	.85	.81
1440.00	.87	.78

SEGMENT RESULTS: CUMULA[illegible] TIMES WEAKEST VS. TIME

CHAIN #	1	1	1	1	1
SEGMENT #	1	2	3	4	5
TIME \ TYPE	0	1	1	6	13
0.00	0	0	0	0	0
10.00	0	0	0	0	0
60.00	0	0	0	0	1
120.00	0	0	6	0	2
190.00	0	0	10	0	4
240.00	0	0	13	0	2
300.00	0	0	12	0	6
370.00	0	0	11	0	2
420.00	0	0	11	0	4
480.00	0	0	9	0	5
550.00	0	0	8	0	4
600.00	0	0	9	0	9
660.00	0	0	14	0	8
730.00	0	0	16	0	7
780.00	0	0	15	0	6
840.00	0	0	16	0	6
910.00	0	0	18	0	7
960.00	0	0	21	0	5
1020.00	0	0	20	0	7
1090.00	0	0	21	0	8
1140.00	0	0	22	0	6

1200.00	0	0	20	0	8
1270.00	0	0	23	0	5
1320.00	0	0	23	0	5
1380.00	0	0	24	0	4
1440.00	0	0	21	0	7

CHAIN RESULTS VS. TIME

AVERAGE EFFECTIVENESS
NO. OF TIMES STRONGEST

TIME	CHAINS 1
0.00	1.00
	50
10.00	1.00
	50
60.00	1.00
	50
120.00	.96
	50
190.00	.93
	50
240.00	.91
	50
300.00	.91
	50
370.00	.93
	50
420.00	.93
	50
480.00	.93
	50
550.00	.93
	50
600.00	.94
	50
660.00	.90
	50
730.00	.90
	50
780.00	.90
	50

840.00	.	.19
	.	50
910.00	.	.88
	.	50
960.00	.	.86
	.	50
1020.00	.	.86
	.	50
1090.00	.	.86
	.	50
1140.00	.	.85
	.	50
1200.00	.	.86
	.	50
1270.00	.	.85
	.	50
1320.00	.	.85
	.	50
1380.00	.	.85
	.	50
1440.00	.	.86
	.	50

AVERAGED REPAIRS ON REPAIRABLE ITEMS

	DECON		LITE		MEDIUM	
ID	ORDERD	DONE	ORDERD	DONE	ORDERD	DONE
2			.81	.70	.16	.11
3			.65	.48	.18	.05

(NOTE: "ORDERD" INCLUDES ANY REORDERS OF DISCONTINUED REPAIRS)

RELIABILITY-TYPE FAILURES

ID		LITEFAIL	MED.FAIL	DEADFAIL
2	FKLFT	.773	.160	.165
3	CRANE	.549	.100	.045

END-OF-ENCOUNTER SUMMARY

	ASSET	.	INITIAL	UNHARMED	CONTAMD	LIT DAM	MED DAM
1	TRUCK	.	1.00	1.00	0.00	0.00	0.00
2	FKLFT	.	1.00	.71	0.00	.08	.05
3	CRANE	.	1.00	.83	0.00	.07	.05

4	RADIO	.	1.00	1.00	0.00	0.00	0.00
5	ALARM	.	2.00	2.00	0.00	0.00	0.00
6	TELE	.	1.00	1.00	0.00	0.00	0.00
14	PARTS	.	100.00	98.67	0.00	0.00	0.00

(((RANDOM NUMBER SEEDS AT END = 1999. 2999. 11926941. 4999. 5999.)))

COMPUTER TIME FOR ENCOUNTER ... 14.429 SECONDS

MNEMONIC CONTROL CARDS
****

1. STOP

STOP READ BY INPUT ROUTINE. NORMAL STOP TAKEN
STOP CALLED FROM INPUT ROUTINE

APPENDIX E

RUN #4 OUTPUT

```
THIS IS AURA ( ARMY UNIT RESILIENCY ANALYSIS ) - LAST UPDATED: < 6 JUL 84 >
*****************************************

          ********************************************
                THIS JOB WAS STARTED ON FRIDAY
              THE 13TH DAY OF JULY ANNO DOMINI 1984
    AT 16 MINUTES AFTER THE HOUR OF 10 O'CLOCK IN THE MORNING
          ********************************************

%%TIMER%%  TIMER. CPUTIM=BEGINNING =      2.084


MNEMONIC CONTROL CARDS
**********************

       1.  DEPLOY

*!*!* WARNING *!*!*  CAN NOT FIND ASSET OR LINK NAMED HANDLOAD            DUMMY LINK CREATED

*!*!* WARNING *!*!*  CAN NOT FIND ASSET OR LINK NAMED REPAIR              DUMMY LINK CREATED
       2.  LINKS

*** WARNING *** LINK HANDLOAD           HAS NO CORRESPONDINGLY NAMED ASSET - ASSUMING DUMMY LINK

*** WARNING *** LINK REPAIR             HAS NO CORRESPONDINGLY NAMED ASSET - ASSUMING DUMMY LINK
       3.  SUBCHA
       4.  TRLINK
       5.  COMPON
       6.  CHAINS
       7.  HEADIN
       8.  FAILUP
       9.  INTERN
      10.  RECONS
      11.  REPLIC
      12.  EXPEND
      13.  REPAIR
      14.  OUTPUT
      15.  VOLLEY
      16.  CONVEH
      17.  DELIVE
      18.  GO
```

ENCOUNTER NUMBER 1

FOURTH EXAMPLE RUN - CONVENTIONAL ATTACKS
RUN ID # 07/13/84 10.15.55.
*.

(((RANDOM NUMBER SEEDS AT START = 1999. 2999. 3999. 4999. 5999.)))

EVENT	TIME	EVENT TYPE	OPERANT CHAINS	WPN TYPE/ RECUPTIME	NO.RNDS/ +/- RAM	DGZ/TLE X	DGZ/TLE Y	DGZ/TLE Z	VOLLEY ANGLE	VOLLEY LENGTH	JEVNT		
1	0.00	INITIAL	1	INF.							0	0	0
2	0.00	USER RCNST	1								999	0	0
3	1.00	CONV. LETH	1	1	42	40.00	40.00	0.00	90.00	0.00	1	1	1
4	11.00	RCNSTITUTE	1	10.00							0	0	1
5	61.00	RCNSTITUTE	1	60.00							0	0	2
6	121.00	RCNSTITUTE	1	120.00							0	0	3
7	180.00	USER RCNST	1								999	0	0
8	190.00	RCNSTITUTE	1	180.00							0	0	1
9	240.00	RCNSTITUTE	1	239.00							0	0	2
10	300.00	CONV. LETH	1	1	42	0.00	0.00	0.00	90.00	0.00	1	2	2
11	310.00	RCNSTITUTE	1	10.00							0	0	1
12	360.00	USER RCNST	1								999	0	0
13	370.00	RCNSTITUTE	1	70.00							0	0	1
14	420.00	RCNSTITUTE	1	120.00							0	0	2
15	480.00	RCNSTITUTE	1	130.00							0	0	3
16	540.00	USER RCNST	1								999	0	0
17	550.00	RCNSTITUTE	1	250.00							0	0	1
18	600.00	RCNSTITUTE	1	300.00							0	0	2
19	650.00	RCNSTITUTE	1	360.00							0	0	3
20	720.00	USER RCNST	1								999	0	0
21	730.00	RCNSTITUTE	1	430.00							0	0	1
22	780.00	RCNSTITUTE	1	480.00							0	0	2
23	840.00	RCNSTITUTE	1	540.00							0	0	3
24	900.00	USER RCNST	1								999	0	0
25	910.00	RCNSTITUTE	1	[illegible]							0	0	1
26	960.00	RCNSTITUTE	1	660.00							0	0	2
27	1020.00	RCNSTITUTE	1	720.00							0	0	3
28	1080.00	USER RCNST	1								999	0	0
29	1090.00	RCNSTITUTE	1	790.00							0	0	1
30	1140.00	RCNSTITUTE	1	840.00							0	0	2
31	1200.00	RCNSTITUTE	1	900.00							0	0	3
32	1260.00	USER RCNST	1								999	0	0
33	1270.00	RCNSTITUTE	1	970.00							0	0	1
34	1320.00	RCNSTITUTE	1	1020.00							0	0	2
35	1380.00	RCNSTITUTE	1	1080.00							0	0	3
36	1440.00	RCNSTITUTE	1	1140.00							0	0	4

MISCELLANEOUS VALUES
....
NO. OF REPLICATIONS = 50
SIGNIFICANCE FOR SUBSTITUTION = .005
TIMES FOR INTERNAL RECONSTITUTION EVALUATION = 10.0 60.0 120.0 180.0

>>>>>>>> INCOMING FIRE DIRECTION (MEASURED CCW FROM THE TARGET X AXIS) IS 0.0 DEGREES <<<<<<<<
>>>>>>>> DOWN WIND DIRECTION (MEASURED CCW FROM THE TARGET X AXIS) IS 0.0 DEGREES <<<<<<<<

****

DETERMINISTIC LETHALITY. FRACTIONAL KILLS ARE ACCOUNTED

****

WPN	TYP	YLD (BLST)/ LT/TYP	YLD(RAD)/ MAX EFF. RADIUS	DELIVERY ERRORS RANGE INDEP.	RANGE VOLLEY	DEFL. INDEP.	DEFL. VOLLEY	HOB	NAMES
1	1	1	52.	(-50.0 ,	160.0)	(-25.0 ,	80.0)	0.0	WRHDICM, CONVENTIONAL

! DELIVERY ERROR .GT. 0. MEANS NORMALLY DISTRIBUTED. .LT. 0. MEANS UNIFORMLY

++++++++++

+ INITIAL TLE = (0.0, 0.0) - DISTR. = NORMAL +

++++++++++

ID	VRS	IVL	CNTBU	PRSFC-MX/MN	GRNUL	EXPND RT	NO.	NAMES
1	1	-1		1.00/ 1.00	1.00		1.00	TRUCK, TRK
2	1	-1		1.00/ 1.00	1.00		1.00	FKLFT
3	1	-1		1.00/ 1.00	1.00		1.00	CRANE, TRK
4	1	-1		1.00/ 1.00	1.00		1.00	RADIO, TALKY
5	0	-1		1.00/ 1.00	1.00		2.00	ALARM, TALKY
6	1	-1		1.00/ 1.00	1.00		1.00	TELE, TALKY
7	5	0			1.00		1.00	R/T OP, PERSONNEL
8	8	0			1.00		1.00	LOADMSTR, PERSONNEL
9	5	0			1.00		1.00	DRIVER, PERSONNEL
10	5	0			1.00		6.00	MEN, PERSONNEL
11	7	0			1.00		1.00	FKLFT OP, PERSONNEL
12	7	0			1.00		1.00	CRANE OP, PERSONNEL
13	6	0			1.00		1.00	RIGGER, PERSONNEL
14	1	-1		1.00/ 1.00	1.00		100.00	PARTS

DEGRADATION BY MOPP AND TOXIC KILL CRITERIA
TOXIC TRANSMISSION FACTORS

TOXIC K.C.	CODE.	DOSE MULT	MOPP 0	MOPP I	MOPP II	MOPP III	MOPP IV
DEFALT MAN	1 .	1.00	1.00	.90	.70	.50	.25
	2 .	-1.00	1.00	****	****	****	****
	3 .	-1.00	1.00	****	****	****	****
	4 .	-1.00	1.00	****	****	****	****
	5 .	-1.00	1.00	****	****	****	****
TRANSMISSION FACTORS			1.00	1.00	1.00	.50	0.00

REPAIRABLE ITEM DATA

ID		DAMAGE	PENALTY	MEAN TIME	STD.DEV.	REPAIR	LOCATION	REPAIR LINK
2	FKLFT	LIGHT	1.000	120.000	50.000	10.000	10.000	*3
2	FKLFT	MEDIUM	1.000	300.000	100.000	10.000	10.000	*3
3	CRANE	LIGHT	1.000	120.000	50.000	10.000	10.000	*3
3	CRANE	MEDIUM	1.000	300.000	100.000	10.000	10.000	*3

RELIABILITY-TYPE FAILURES
****

ID		MTBTF	LITE	MED.
2	FKLFT	720.000	.800	.100
3	CRANE	1080.000	.800	.100

LINKS
*****

LNK	NAME	HOME ID	INLNK	MAX IN	MAX EFF(%)	MIN IN	MIN EFF(%)	MAX INLINK	ASSOCIATED LINK	DGR SET
1	HANDLOAD	0	-5.00	5.00	65	1.00	0	UNLMTD	NONE	0
2	REPAIR	0	-2.00	2.00	100	0.00	0	UNLMTD	NONE	0
3	DRIVER	3	1.00	1.00	100	0.00	0	1.00	TRUCK	0
4	RADIO	4	1.00	1.00	100	0.00	0	UNLMTD	NONE	
5	TELE	5	1.00	1.00	100	0.00	0	UNLMTD	NONE	
6	TRUCK	1	1.00	1.00	100	0.00	0	UNLMTD	NONE	
7	CRANE OP	12	1.00	1.00	100	0.00	0	1.00	CRANE	0
8	RIGGER	13	1.00	1.00	100	0.00	0	UNLMTD	NONE	0
9	R/T OP	7	1.00	1.00	100	0.00	0	1.00	NONE	0
10	FKLFT	2	1.00	1.00	100	0.00	0	UNLMTD	NONE	
11	CRANE	3	1.00	1.00	100	0.00	0	UNLMTD	NONE	
12	FKLFT OP	11	1.00	1.00	100	0.00	0	1.00	FKLFT	0
13	LOADMSTR	8	1.00	1.00	100	0.00	75	2.00	NONE	0
14	PARTS	14	100.00	1.00	100	0.00	0	UNLMTD	NONE	< EXPENDIBLE >
95	NOT IN LINK		8.00							

LNKFG

KEY: SUBST. TIME/SUBST. EFFECTIVENESS/SUBST. ORDER-READ-IN

ASSET	1 HANDLOAD	2 REPAIR	3 DRIVER	4 RADIO	5 TELE	6 TRUCK	7 CRANE OP	8 RIGGER	9 R/T OP	10 FKLFT	11 CRANE	12 FKLFT OP
1 TRUCK	>					H						
2 FKLFT	>									H		
3 CRANE	>										H	
4 RADIO	>			H								
5 ALARM	>											
6 TELE	>				H							
7 R/T OP	> 5/1.0/1		15/.95/2					5/.60/1	H			5/.20/3
8 LOADMSTR	> 5/1.0/1	15/1.0/1	15/.95/2				5/1.0/3	5/.60/1	20/1.0/1			5/1.0/2
9 DRIVER	> 5/1.0/1		H					5/.60/1	15/.80/2			5/.20/3
10 MEN	> 5/1.0/1		15/.85/2					5/.60/1	15/.80/2			5/.20/3
11 FKLFT OP	> 5/1.0/1	10/1.0/3	15/.95/2				10/.80/1	5/.60/1	15/.80/2			H
12 CRANE OP	> 5/1.0/1	15/1.0/2	15/.85/2				H	5/.60/1	15/.80/2			10/.90/1
13 RIGGER	> 5/1.0/1		15/.85/2				5/.50/2	H	15/.80/2			5/.20/3
14 PARTS	>											

	LOADMSTR	PARTS	
	TR		
			NOLINK

ASSET	13	14	95
1 TRUCK			
2 FKLFT			
3 CRANE			
4 RADIO			
5 ALARM			H
6 TELE			
7 R/T OP			
8 LOADMSTR	H		
9 DRIVER			
10 MEN			H
11 FKLFT OP			
12 CRANE OP			
13 RIGGER			
14 PARTS		H	

LINKS IN EACH SUBCHAIN
****

SUBCHAIN	LINKS		
*1	13	12	
*2	11	7	6
*3	2	14	

BRANCHES IN EACH ORLINK
++++++++++

ORLINK	BRANCHES	
+1	4	5
+2	*1	1

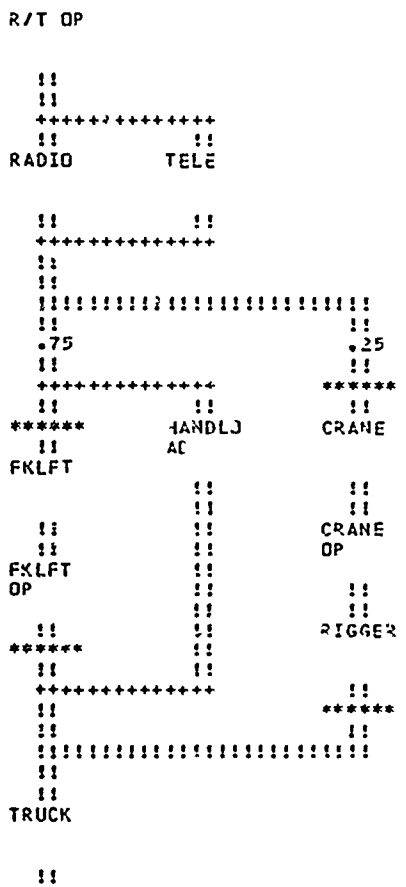
COMPOUND (CP) LINKS
****

CP LINK	CP PARTS	
!LOADING TECHNIQUE	+2 (.75)	*2 (.25)

SEGMENTS IN EACH CHAIN
****

SEG	CHAINS 1
1	R/T OP
2	+1
3	!LOADING TECHNIQUE
4	TRUCK
5	LOADMSTR

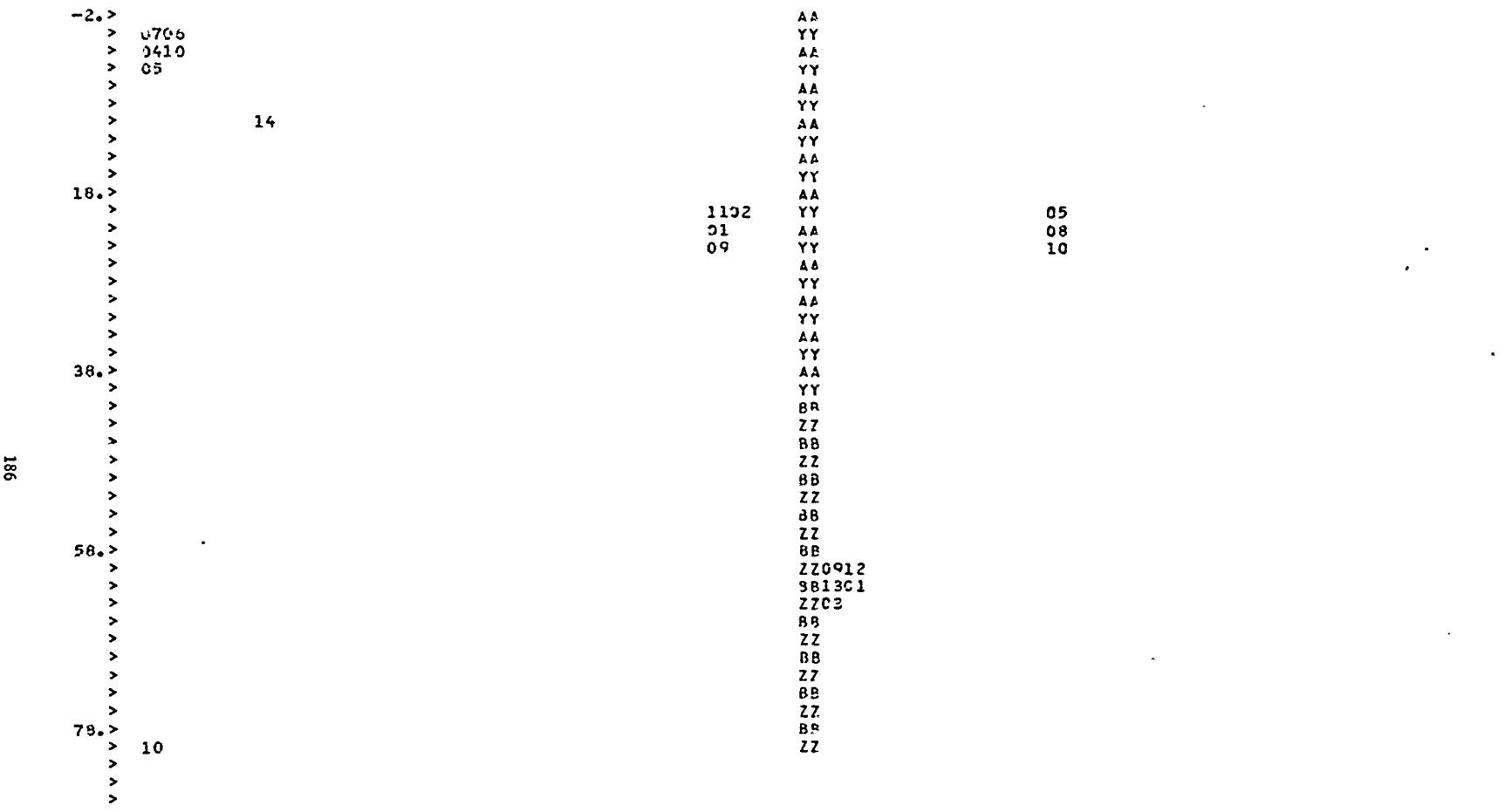
*** PLOT OF CHAIN # 1 OPERANT TIMES:(0.00 - INF.)



DEPLOYMENT
****

	ID	ASSET	LNK	XTAR	YTAR	HOWMNY	KCAT	NKCAT	TKCAT	PSTR	NUCVR	MOPP
1	7	R/T OP	9	[illegible]	0.0	1.00	1	1	2	1	1	0
2	4	RADIO	4	0.0	[illegible]	1.00	1	1	1	1	1	0
3	5	ALARM	95	0.0	0.0	1.00	1	1	1	1	1	0
4	6	TELE	5	0.0	0.0	1.00	1	1	1	1	1	0
5	10	MEN	95	90.0	0.0	2.00	1	1	1	1	1	1
6	10	MEN	95	0.0	1.0	2.00	1	1	1	1	1	1
7	14	PARTS	14	10.0	10.0	100.00	1	1	1	1	1	0
8	6	REPAIR	2	10.0	10.0	-2.00	1	1	1	1	1	0
9	11	FKLFT OP	12	20.0	50.0	1.00	1	1	3	1	1	0
10	0	HANDLOAD	1	20.0	50.0	-5.00	1	1	4	1	1	0
11	1	TRUCK	6	20.0	50.0	.60	1	1	1	1	1	0
12	9	DRIVER	3	20.0	50.0	.60	1	1	3	1	1	0
13	2	FKLFT	10	20.0	50.0	1.00	1	1	1	1	1	0
14	9	DRIVER	3	60.0	60.0	.40	1	1	3	1	1	0
15	13	RIGGER	8	60.0	60.0	1.00	1	1	4	1	1	0
16	3	CRANE	11	60.0	60.0	1.00	1	1	1	1	1	0
17	12	CRANE OP	7	60.0	60.0	1.00	1	1	3	1	1	0
18	1	TRUCK	6	60.0	60.0	.40	1	1	1	1	1	0
19	5	ALARM	95	20.0	80.0	1.00	1	1	1	1	1	0
20	8	LOADMSTR	13	20.0	80.0	1.00	1	1	5	1	1	0
21	10	MEN	95	20.0	80.0	2.00	1	1	1	1	1	1

DEPLOYMENT Y (ACROSS) INTERVAL = X INTERVAL = 2. INITIAL INCOMING DIRECTION FROM AA TO BB DOWN WIND FROM YY TO ZZ



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^^^^^^ FINISHED INPUT AND INPUT CHECKS ^^^^^^
%%TIMER%%  CPUTIM =      3.8851


 <***> BEGINNING REPLICATION    1.   RND. NO. SEEDS =        1999.       2999.       3999.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME    61.00  <<<

%%TIMER%%  FINISHED REPLIC.   1. CPUTIM=     4.239.  TOP OF MEMORY ( ITOP ) =  52590


 <***> BEGINNING REPLICATION    2.   RND. NO. SEEDS =    63797906.       2999. 2114155205.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME   900.00  <<<
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   16 HAD A LITE FAILURE AT TIME   900.00  <<<

%%TIMER%%  FINISHED REPLIC.   2. CPUTIM=     4.491.  TOP OF MEMORY ( ITOP ) =  52590


 <***> BEGINNING REPLICATION    3.   RND. NO. SEEDS =   734128188.       2999. 1941601017.       4999.       5999. <***>


** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.30. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   14.6,   55.8,    0.0 )
  ***CASUALTY*** ID:  11 IN LNK  12. PKF= 1.00 PK** AT TGTPT    9 (   20.0,   50.0) =  1.00
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK** AT TGTPT   11 (   20.0,   50.0) =   .18
  ***CASUALTY*** ID:   9 IN LNK   3. PKF= 1.00 PK** AT TGTPT   12 (   20.0,   50.0) =   .60

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000  0.0000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK** AT TGTPT   13 (   20.0,   50.0) =   .30

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK** AT TGTPT   16 (   60.0,   60.0) =   .30

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   15.2,   50.0,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK** AT TGTPT   11 (   20.0,   50.0) =   .13

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000  0.0000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK** AT TGTPT   13 (   20.0,   50.0) =   .21

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK** AT TGTPT   16 (   60.0,   60.0) =   .21

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    1.8,   88.9,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK** AT TGTPT   13 (   20.0,   50.0) =   .15
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** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   -9.8,   73.6,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK**# AT TGTPT   13 (   20.0,   50.0) =   .10

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (  -19.2,   45.0,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK**# AT TGTPT   13 (   20.0,   50.0) =   .07

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (  -12.1,   77.0,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK**# AT TGTPT   13 (   20.0,   50.0) =   .05

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (  -23.0,   62.0,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK**# AT TGTPT   13 (   20.0,   50.0) =   .04

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (  -20.0,   44.4,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK**# AT TGTPT   13 (   20.0,   50.0) =   .02

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (  -12.8,   67.6,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK**# AT TGTPT   13 (   20.0,   50.0) =   .02

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    7.9,   40.0,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK**# AT TGTPT   11 (   20.0,   50.0) =   .09

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK**# AT TGTPT   13 (   20.0,   50.0) =   .01

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   -7.9,   59.4,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK**# AT TGTPT   13 (   20.0,   50.0) =   .01

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (     .6,   44.2,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK**# AT TGTPT   11 (   20.0,   50.0) =   .06

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK**# AT TGTPT   13 (   20.0,   50.0) =   .01
>>>       .420 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME   840.00  <<<
>>>       .178 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME   960.00  <<<

%%TIMER%% FINISHED REPLIC.   3. CPUTIM=     4.358.  TOP OF MEMORY ( ITOP ) =  52590


 <***> BEGINNING REPLICATION    4.   RND. NO. SEEDS =  1040799432.       2999.  573026941.       4999.       5999. <***>


** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   -3.3,   65.9,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK**# AT TGTPT   13 (   20.0,   50.0) =   .30
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** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    37.4,   98.2,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   8 IN LNK  11. PKF= .30) PK*# AT TGTPT   16 (   60.0,   60.0) =   .30

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    70.8,   95.4,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .21

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    34.0,   90.0,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .21

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .15
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .30

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   -10.8,   81.4,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .15

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    64.4,   60.8,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .10
  ***CASUALTY*** ID:   9 IN LNK   3. PKF= 1.00 PK*# AT TGTPT   14 (   60.0,   60.0) =   .40
  ***CASUALTY*** ID:  13 IN LNK   9. PKF= 1.00 PK*# AT TGTPT   15 (   60.0,   60.0) =  1.00
        ..JUNK CAS.. ID:   3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =       .197

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000  0.0000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .10
  ***CASUALTY*** ID:  12 IN LNK   7. PKF= 1.00 PK*# AT TGTPT   17 (   60.0,   60.0) =  1.00
  ***CASUALTY*** ID:   1 IN LNK   6. PKF= .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .12

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    50.3,  106.7,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .07

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    66.4,   80.9,    0.0 )
        ..JUNK CAS.. ID:   3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =       .160

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000  0.0000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .05
  ***CASUALTY*** ID:   1 IN LNK   6. PKF= .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .08

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    30.6,   92.1,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .07

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .04
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .21

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (     -.4,   62.3,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF= .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .18

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .05
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** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    60.9,  101.7,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .02

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   -22.7,   58.7,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .04

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    -7.5,   74.9,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .02

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    18.7,   73.3,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .13

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .02

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .02
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .15
  ***CASUALTY*** ID:   8 IN LNK  13. PKF= 1.00 PK*# AT TGTPT   20 (   20.0,   80.0) =  1.00
  ***CASUALTY*** ID:  10 IN LNK  95. PKF= 1.00 PK*# AT TGTPT   21 (   20.0,   80.0) =  2.00

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    28.3,   74.4,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .01

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .01
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .10

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    48.7,   87.7,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000  0.0000   .3000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .01

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .01

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (     1.7,   74.6,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .01
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .07

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    22.3,   60.1,    0.0 )
  ***CASUALTY*** ID:  11 IN LNK  12. PKF= 1.00 PK*# AT TGTPT    9 (   20.0,   50.0) =  1.00
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .09
  ***CASUALTY*** ID:   9 IN LNK   3. PKF= 1.00 PK*# AT TGTPT   12 (   20.0,   50.0) =   .60
        ..JUNK CAS.. ID:   2 AT (   20.0,   50.0).   TOTAL JUNK FURTHER DAMAGED =      .296

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   .3000  0.0000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .00

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .01

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    57.7,   60.3,    0.0 )
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                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .00
       ..JUNK CAS.. ID:   3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =       .476

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   1.0000  0.0000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= 1.00 PK*# AT TGTPT   16 (   60.0,   60.0) =   .01
  ***CASUALTY*** ID:   1 IN LNK   6. PKF= 1.00 PK*# AT TGTPT   18 (   60.0,   60.0) =   .20

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    26.0,   89.8,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .00
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .05

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    26.7,   67.5,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF= .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .06
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .04

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    29.0,   79.3,    0.0 )
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .02

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    41.0,   60.2,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF= .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .04

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (     6.3,   81.9,    0.0 )
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .02

%%TIMER%%  FINISHED REPLIC.   4. CPUTIM=     5.156.  TOP OF MEMORY ( ITOP ) =  52590


 <****> BEGINNING REPLICATION    5.   RND. NO. SEEDS =   665353686.       2999.  128599714.       4999.       5999. <****>


** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (     3.6,  -14.4,    0.0 )
  ***CASUALTY*** ID:   4 IN LNK   6. PKF= .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .30
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .30
  ***CASUALTY*** ID:   4 IN LNK   5. PKF= .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .30
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   16 HAD A LITE FAILURE AT TIME   121.00  <<<
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME  1090.00  <<<

%%TIMER%%  FINISHED REPLIC.   5. CPUTIM=     5.416.  TOP OF MEMORY ( ITOP ) =  52590


 <****> BEGINNING REPLICATION    6.   RND. NO. SEEDS =   316254356.  186531390.  997761745.       4999.       5999. <****>


** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    56.7,  104.2,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .30

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    49.9,   96.4,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .21
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** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (    40.0,    40.0,     0.0 )  AGZ = (    61.1,    89.7,     0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000    .3000   0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,    60.0) =    .15

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (    40.0,    40.0,     0.0 )  AGZ = (    68.8,    96.3,     0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000    .3000   0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,    60.0) =    .10

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (    40.0,    40.0,     0.0 )  AGZ = (    75.0,   106.5,     0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000    .3000   0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,    60.0) =    .07

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (    40.0,    40.0,     0.0 )  AGZ = (    84.3,    99.1,     0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000    .3000   0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,    60.0) =    .05

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (     0.0,     0.0,     0.0 )  AGZ = (    77.7,    97.0,     0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000    .3000   0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,    60.0) =    .19

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (     0.0,     0.0,     0.0 )  AGZ = (    87.8,    95.7,     0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000    .3000   0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,    60.0) =    .13

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (     0.0,     0.0,     0.0 )  AGZ = (    52.8,    81.1,     0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000    .3000   0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,    50.0) =    .30
       ..JUNK CAS.. ID:   3 AT (   60.0,    60.0).   TOTAL JUNK FURTHER DAMAGED =       .095

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000   0.0000   0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,    60.0) =    .09
  ***CASUALTY*** ID:   1 IN LNK   6. PKF= .30 PK*# AT TGTPT   16 (   60.0,    60.0) =    .12

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (     0.0,     0.0,     0.0 )  AGZ = (     1.7,    84.7,     0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000    .3000   0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,    50.0) =    .21
  ***CASUALTY*** ID:   3 IN LNK  95. PKF= .30 PK*# AT TGTPT   19 (   20.0,    80.0) =    .30

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (     0.0,     0.0,     0.0 )  AGZ = (    47.7,   104.3,     0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000    .3000   0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,    60.0) =    .06

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (     0.0,     0.0,     0.0 )  AGZ = (    90.3,    87.8,     0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000    .3000   0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,    60.0) =    .04

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (     0.0,     0.0,     0.0 )  AGZ = (    30.1,   102.5,     0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   0.0000    .3000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,    60.0) =    .03

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (     0.0,     0.0,     0.0 )  AGZ = (    21.9,    92.9,     0.0 )
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                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .15
        ..JUNK CAS.. ID:   3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =       .009

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .02
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .21

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    64.3,  101.5,    0.0 )
        ..JUNK CAS.. ID:   3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =       .007

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .02

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    89.0,   82.6,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .01

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    44.6,   94.8,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .01

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    70.3,  105.6,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .01

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    65.1,  103.7,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .00

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    -5.2,   80.1,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .10

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    61.1,  108.2,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .00

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    -1.9,   87.3,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .07

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    31.1,   93.4,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .05
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .15

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    41.1,   91.0,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .04

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    15.6,   92.3,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .02
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  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .10
  ***CASUALTY*** ID:  10 IN LNK  95. PKF= 1.00 PK*# AT TGTPT   21 (   20.0,   80.0) =  2.00
>>>       .638 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME   480.00  <<<
>>>       .209 UNIT FROM ID   3 AT TGT. PT.   16 HAD A MED  FAILURE AT TIME   660.00  <<<

%%TIMER%%  FINISHED REPLIC.   6. CPUTIM=     6.008.  TOP OF MEMORY ( ITOP ) =  52590


 <***> BEGINNING REPLICATION    7.   RND. NO. SEEDS =  1672027476.  186531390.  186147796.       4999.       5999. <***>


** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    82.7,   -3.8,    0.0 )
  ***CASUALTY*** ID:  10 IN LNK  95. PKF= 1.00 PK*# AT TGTPT    5 (   60.0,    0.0) =  2.00

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    58.3,    9.9,    0.0 )

                   <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .30

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    90.8,   26.4,    0.0 )

                   <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .21

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    78.4,   26.7,    0.0 )

                   <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .15

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    63.2,   31.0,    0.0 )

                   <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .30

                   <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .10

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    66.6,   13.9,    0.0 )

                   <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .07

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    92.5,   38.9,    0.0 )

                   <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .05

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    67.0,   29.3,    0.0 )

                   <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .04

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    54.2,   35.6,    0.0 )

                   <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .21

                   <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .02
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** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    64.2,   23.0,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .02

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    78.7,   37.4,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .01

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    89.3,   20.0,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .01

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    89.9,   28.9,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .01

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    85.1,   41.5,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .00

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    53.6,   10.4,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .00

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    74.6,   17.3,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .00
>>>       .490 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME   240.00  <<<

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    65.4,   68.1,    0.0 )
  ***CASUALTY*** ID:  13 IN LNK   8. PKF= 1.00 PK*# AT TGTPT   15 (   60.0,   60.0) =  1.00

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000  0.0000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .07
  ***CASUALTY*** ID:   8 IN LNK   7. PKF= 1.00 PK*# AT TGTPT   17 (   60.0,   60.0) =   .06
  ***CASUALTY*** ID:   1 IN LNK   6. PKF= .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .12

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    83.7,   68.9,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .05

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    79.8,   94.3,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .03

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    91.4,  100.3,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .02

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    66.0,   82.8,    0.0 )
       ..JUNK CAS.. ID:   3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =       .033

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000  0.0000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .02
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  ***CASUALTY*** ID:    1 IN LNK    6. PKF=  .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .08

** EMPL. # (VOLLEY)    2 (    2). WPN NO.  1. AT TIME    300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    71.1,    85.9,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:    3 IN LNK   11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .01

** EMPL. # (VOLLEY)    2 (    2). WPN NO.  1. AT TIME    300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    80.2,    70.5,    0.0 )
        ..JUNK CAS.. ID:    3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =       .026

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000  0.0000  0.0000
  ***CASUALTY*** ID:    3 IN LNK   11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .01
  ***CASUALTY*** ID:    1 IN LNK    6. PKF=  .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .06

** EMPL. # (VOLLEY)    2 (    2). WPN NO.  1. AT TIME    300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    76.4,    63.6,    0.0 )
        ..JUNK CAS.. ID:    3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =       .018

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000  0.0000  0.0000
  ***CASUALTY*** ID:    3 IN LNK   11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .01
  ***CASUALTY*** ID:    1 IN LNK    6. PKF=  .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .04

** EMPL. # (VOLLEY)    2 (    2). WPN NO.  1. AT TIME    300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    72.6,    92.6,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:    3 IN LNK   11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .00

** EMPL. # (VOLLEY)    2 (    2). WPN NO.  1. AT TIME    300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    67.3,    85.3,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:    3 IN LNK   11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .00

** EMPL. # (VOLLEY)    2 (    2). WPN NO.  1. AT TIME    300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (   104.5,    68.0,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:    3 IN LNK   11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .00

** EMPL. # (VOLLEY)    2 (    2). WPN NO.  1. AT TIME    300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    63.8,    67.5,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:    2 IN LNK   10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .02
  ***CASUALTY*** ID:    1 IN LNK    6. PKF=  .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .03

** EMPL. # (VOLLEY)    2 (    2). WPN NO.  1. AT TIME    300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    68.9,    76.9,    0.0 )
  ***CASUALTY*** ID:    1 IN LNK    6. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .02

** EMPL. # (VOLLEY)    2 (    2). WPN NO.  1. AT TIME    300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    74.4,    70.1,    0.0 )
  ***CASUALTY*** ID:    1 IN LNK    6. PKF=  .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .01
>>>       .631 UNIT FROM ID   3 AT TGT. PT.   16 HAD A LITE FAILURE AT TIME  1200.00  <<<

%%TIMER%%  FINISHED REPLIC.   7. CPUTIM=     6.000.  TOP OF MEMORY ( ITOP ) = 52590


 <***> BEGINNING REPLICATION    8.   RND. NO. SEEDS =  1011753214.  1865313900. 1868661004.       4999.       5999. <***>


** EMPL. # (VOLLEY)    1 (    1). WPN NO.  1. AT TIME      1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    43.9,    25.0,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:    2 IN LNK   10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .30
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                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
   ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .30

 ** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    27.2,    9.6,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
   ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .21

 ** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    69.3,   -3.2,    0.0 )
   ***CASUALTY*** ID:  10 IN LNK  95. PKF= 1.00 PK*# AT TGTPT    5 (   80.0,    0.0) =  2.00

 ** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (     9.7,   24.0,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
   ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .15

 ** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    97.0,   24.5,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
   ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .21

 ** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    28.3,    8.9,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
   ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .10

 ** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    57.5,   15.9,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
   ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .15

 ** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    48.4,   14.3,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
   ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .07

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
   ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .10

 ** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (     3.0,   -5.7,    0.0 )
   ***CASUALTY*** ID:   7 IN LNK   9. PKF= 1.00 PK*# AT TGTPT    1 (    0.0,    0.0) =  1.00
   ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .30
   ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .30
   ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .30
   ***CASUALTY*** ID:  10 IN LNK  95. PKF= 1.00 PK*# AT TGTPT    6 (    0.0,    1.0) =  2.00

 ** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    15.5,   -3.9,    0.0 )
   ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .21
   ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .21
   ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .21

 ** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (     4.9,   11.5,    0.0 )
   ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .15
   ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .15
   ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .15

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
   ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .05

 ** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (     5.5,  -17.9,    0.0 )
   ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .10
   ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .10
   ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .10
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** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    9.0,   10.1,    0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .07
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .07
  ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .07
  ***CASUALTY*** ID:  14 IN LNK  14. PKF= 1.00 PK*# AT TGTPT    7 (   10.0,   10.0) =100.00

                   <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   . IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .04

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   71.5,   14.4,    0.0 )

                   <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .07

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   21.0,   21.6,    0.0 )

                   <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  13. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .02

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   15.6,    4.7,    0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .05
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .05
  ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .05

                   <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  13. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .02

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   73.1,   16.2,    0.0 )

                   <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .05

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    4.2,   10.9,    0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .04
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .04
  ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .04

                   <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  13. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .01

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   30.3,   14.4,    0.0 )

                   <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  13. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .01

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   81.5,   14.3,    0.0 )

                   <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .04

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   13.3,    3.4,    0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .02
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .02
  ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .02

                   <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  13. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .01

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  2. AT TIME    300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    6.5,    7.8,    0.0 )
  ***CASUALTY*** ID:   9 IN LNK   9. PKF= 1.00 PK*# AT TGTPT    1 (    0.0,    0.0) =  1.00
  ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .02
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,    1.0) =   .16
  ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .02
  ***CASUALTY*** ID:  10 IN LNK  95. PKF= 1.00 PK*# AT TGTPT    6 (    0.0,    1.0) =   .33
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                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .00

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    -.4,   11.1,    0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .01
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .11
  ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .01

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .00

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (   14.5,   -5.3,    0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .01
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .08
  ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .01

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (   -7.9,   -1.5,    0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .01
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .05
  ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .01

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (   13.2,  -13.2,    0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .03
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .04
  ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .00

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    6.4,  -14.1,    0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .00
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .03
  ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .00

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    6.0,    9.2,    0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .00
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .02
  ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .00

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .00

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   3  .00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (   -3.6,  -15.7,    0.0 )
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .01

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (   -2.5,   -6.5,    0.0 )
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .01

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (   -5.0,  -10.4,    0.0 )
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .01
>>>       .082 UNIT FROM ID   3 AT TGT. PT.   16 HAD A LITE FAILURE AT TIME   480.00  <<<

%%TIMER%%  FINISHED REPLIC.   8. CPUTIM=     5.917.  TOP OF MEMORY ( ITOP ) =  52590



 <***> BEGINNING REPLICATION    9.   RND. NO. SEEDS =  1940475265.  186531390.   16034055.       4999.       5999. <***>



%%TIMER%%  FINISHED REPLIC.   9. CPUTIM=     7.152.  TOP OF MEMORY ( ITOP ) =  52590
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 <***> BEGINNING REPLICATION   10.   RND. NO. SEEDS =   934053899.  1865313900. 1354000673.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME   300.00  <<<
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   16 HAD A LITE FAILURE AT TIME   370.00  <<<
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME  1260.00  <<<

%%TIMER%%  FINISHED REPLIC.  10. CPUTIM=     7.552.  TOP OF MEMORY ( ITOP ) =  52590


 <***> BEGINNING REPLICATION   11.   RND. NO. SEEDS =  1293538396.  1865313900.  396920764.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.   13 HAD A MED  FAILURE AT TIME   370.00  <<<
>>>       .035 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME   600.00  <<<
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   16 HAD A DEAD FAILURE AT TIME   720.00  <<<
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME  1140.00  <<<

%%TIMER%%  FINISHED REPLIC.  11. CPUTIM=     7.856.  TOP OF MEMORY ( ITOP ) =  52590


 <***> BEGINNING REPLICATION   12.   RND. NO. SEEDS =  1119229949.  1865313900.  392352403.       4999.       5999. <***>


%%TIMER%%  FINISHED REPLIC.  12. CPUTIM=     8.095.  TOP OF MEMORY ( ITOP ) =  52590


 <***> BEGINNING REPLICATION   13.   RND. NO. SEEDS =   678959930.  1865313900. 1952013376.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME   121.00  <<<
>>>       .111 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME   190.00  <<<
>>>       .898 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME   480.00  <<<
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   16 HAD A LITE FAILURE AT TIME   480.00  <<<

%%TIMER%%  FINISHED REPLIC.  13. CPUTIM=     8.549.  TOP OF MEMORY ( ITOP ) =  52590


 <***> BEGINNING REPLICATION   14.   RND. NO. SEEDS =  2042859962.  1535658748.  598494228.       4999.       5999. <***>


** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   50.9,   58.7,    0.0 )

                  <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK** AT TGTPT   13 (   20.0,   50.0) =   .30
  ***CASUALTY*** ID:   9 IN LNK   3. PKF= 1.00 PK** AT TGTPT   14 (   60.0,   60.0) =   .40
  ***CASUALTY*** ID:  13 IN LNK   8. PKF= 1.00 PK** AT TGTPT   15 (   60.0,   60.0) =  1.00
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                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000  0.0000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK** AT TGTPT   16 (   60.0,   60.0) =   .30
  ***CASUALTY*** ID:  12 IN LNK   7. PKF= 1.00 PK** AT TGTPT   17 (   60.0,   60.0) =  1.00
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK** AT TGTPT   18 (   60.0,   60.0) =   .12

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    62.4,    58.5,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK** AT TGTPT   13 (   20.0,   50.0) =   .21

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   1.0000  0.0000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= 1.00 PK** AT TGTPT   16 (   60.0,   60.0) =   .70
  ***CASUALTY*** ID:   1 IN LNK   6. PKF= 1.00 PK** AT TGTPT   18 (   60.0,   60.0) =   .28

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   -12.8,    59.0,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK** AT TGTPT   13 (   20.0,   50.0) =   .15

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    -5.0,    61.7,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK** AT TGTPT   13 (   20.0,   50.0) =   .10

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    29.5,    66.6,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK** AT TGTPT   11 (   20.0,   50.0) =   .18

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK** AT TGTPT   13 (   20.0,   50.0) =   .07
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK** AT TGTPT   19 (   20.0,   80.0) =   .30

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    42.3,    63.6,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK** AT TGTPT   13 (   20.0,   50.0) =   .05

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    44.7,    79.5,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK** AT TGTPT   13 (   20.0,   50.0) =   .04

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (     2.2,    69.7,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK** AT TGTPT   13 (   20.0,   50.0) =   .02

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    -3.3,    65.4,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK** AT TGTPT   13 (   20.0,   50.0) =   .02

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    -6.7,    53.3,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK** AT TGTPT   13 (   20.0,   50.0) =   .01

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    32.7,    59.8,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK** AT TGTPT   11 (   20.0,   50.0) =   .13

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK** AT TGTPT   13 (   20.0,   50.0) =   .01

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    35.0,    54.5,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK** AT TGTPT   11 (   20.0,   50.0) =   .09
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                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .01

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    11.3,   81.3,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .00
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .21
  ***CASUALTY*** ID:   8 IN LNK  13. PKF= 1.00 PK*# AT TGTPT   20 (   20.0,   80.0) =  1.00
  ***CASUALTY*** ID:  10 IN LNK  95. PKF= 1.00 PK*# AT TGTPT   21 (   20.0,   80.0) =  2.00

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   -18.7,   61.5,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .00

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   -22.7,   57.5,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .00

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (     2.8,   53.8,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF= .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .06

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    13.3,   87.6,    0.0 )
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .15

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    14.5,   81.5,    0.0 )
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .10

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    25.4,   73.9,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF= .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .04
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .07

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    36.0,   74.2,    0.0 )
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .05

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (     6.7,   78.4,    0.0 )
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .04

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    42.6,   60.2,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF= .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .03

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    14.2,   73.7,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF= .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .02
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .02

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (     5.4,   87.3,    0.0 )
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .02

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    14.6,   96.0,    0.0 )
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .01

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    27.2,   94.5,    0.0 )
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .01

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    35.4,   74.6,    0.0 )
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .01

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    17.7,   83.8,    0.0 )
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .00
>>>       .655 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME  1080.00  <<<
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%%TIMER%%  FINISHED REPLIC.  14. CPUTIM=      8.843.  TOP OF MEMORY ( ITOP ) =  52590


 <****> BEGINNING REPLICATION   15.   RND. NO. SEEDS =  1124841800. 1454809091.  153154083.       4999.       5999. <****>


>>>       1.000 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME   240.00  <<<
>>>       1.000 UNIT FROM ID   3 AT TGT. PT.   16 HAD A MED  FAILURE AT TIME   240.00  <<<

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (     0.0,     0.0,     0.0 ) AGZ = (    62.5,    74.2,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .12

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (     0.0,     0.0,     0.0 ) AGZ = (    70.2,    74.8,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .08

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (     0.0,     0.0,     0.0 ) AGZ = (    36.6,    67.5,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .18

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .03
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .06

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (     0.0,     0.0,     0.0 ) AGZ = (    48.1,    86.7,    0.0 )

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .02

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (     0.0,     0.0,     0.0 ) AGZ = (    42.7,    86.3,    0.0 )

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .02

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (     0.0,     0.0,     0.0 ) AGZ = (    79.0,    70.0,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .04

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (     0.0,     0.0,     0.0 ) AGZ = (    71.2,    73.4,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .03

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (     0.0,     0.0,     0.0 ) AGZ = (    73.8,    67.6,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .02

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (     0.0,     0.0,     0.0 ) AGZ = (    33.2,    80.9,    0.0 )

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .01
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .30

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (     0.0,     0.0,     0.0 ) AGZ = (    51.6,    79.4,    0.0 )

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .01
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .01

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (     0.0,     0.0,     0.0 ) AGZ = (    65.8,    73.2,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .01
>>>       .993 UNIT FROM ID   2 AT TGT. PT.   13 HAD A DEAD FAILURE AT TIME   360.00  <<<
>>>       .421 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME   420.00  <<<
>>>       .307 UNIT FROM ID   3 AT TGT. PT.   16 HAD A LITE FAILURE AT TIME   480.00  <<<
>>>       .937 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME   840.00  <<<

%%TIMER%%  FINISHED REPLIC.  15. CPUTIM=      9.157.  TOP OF MEMORY ( ITOP ) =  52590
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 <***> BEGINNING REPLICATION   16.   RND. NO. SEEDS =  1222627088.  276442901. 1805669448.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME   180.00  <<<
>>>       .081 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME   300.00  <<<

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    46.4,    47.1,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK** AT TGTPT   13 (   20.0,   50.0) =   .10

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000  0.0000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK** AT TGTPT   16 (   60.0,   60.0) =   .30
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK** AT TGTPT   18 (   60.0,   60.0) =   .12

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    84.6,     4.7,    0.0 )
  ***CASUALTY*** ID:  10 IN LNK  95. PKF= 1.00 PK** AT TGTPT    5 (   80.0,    0.0) =   .67

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    57.1,    28.7,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK** AT TGTPT   13 (   20.0,   50.0) =   .07

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK** AT TGTPT   16 (   60.0,   60.0) =   .21

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    58.5,    37.6,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK** AT TGTPT   13 (   20.0,   50.0) =   .05
        ..JUNK CAS.. ID:   3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =      .063

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000  0.0000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK** AT TGTPT   16 (   60.0,   60.0) =   .15
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK** AT TGTPT   18 (   60.0,   60.0) =   .08

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    63.6,    32.1,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK** AT TGTPT   13 (   20.0,   50.0) =   .03

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK** AT TGTPT   16 (   60.0,   60.0) =   .10

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    47.3,    22.6,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK** AT TGTPT   13 (   20.0,   50.0) =   .02

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK** AT TGTPT   16 (   60.0,   60.0) =   .07

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    63.4,    42.6,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK** AT TGTPT   13 (   20.0,   50.0) =   .02
        ..JUNK CAS.. ID:   3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =      .097

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000  0.0000  0.0000
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   ***CASUALTY*** ID:    3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .05
   ***CASUALTY*** ID:    1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .06

 ** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    61.4,   11.3,   0.0 )

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
   ***CASUALTY*** ID:    3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .04

 ** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    97.7,   33.1,   0.0 )

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
   ***CASUALTY*** ID:    3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .02

 ** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    92.3,   37.8,   0.0 )

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
   ***CASUALTY*** ID:    3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .02

 ** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    83.6,   23.8,   0.0 )

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
   ***CASUALTY*** ID:    3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .01

 ** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    57.6,   36.4,   0.0 )

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
   ***CASUALTY*** ID:    2 IN LNK  10. PKF=  .3) PK*# AT TGTPT   13 (   20.0,   50.0) =   .01
         ..JUNK CAS.. ID:    3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =       .094

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000  0.0000  0.0000
   ***CASUALTY*** ID:    3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .01
   ***CASUALTY*** ID:    1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .04

 ** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    48.6,   40.6,   0.0 )

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
   ***CASUALTY*** ID:    2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .01
         ..JUNK CAS.. ID:    3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =       .066

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000  0.0000  0.0000
   ***CASUALTY*** ID:    3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .01
   ***CASUALTY*** ID:    1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .03

 ** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    94.7,   42.5,   0.0 )

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
   ***CASUALTY*** ID:    3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .00

 ** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    66.6,   12.3,   0.0 )

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
   ***CASUALTY*** ID:    3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .00

 ** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    92.1,   37.6,   0.0 )

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
   ***CASUALTY*** ID:    3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .00

 ** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    46.1,   14.7,   0.0 )

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
   ***CASUALTY*** ID:    2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .01
 ** THREAT TO REPAIR OF     .57? UNITS OF ID   2 AT COORDS    10.0,    10.0
                     PKS = 0.000, .300, .300, AND RN =  .131
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                    MEDIUM. PUT INTO MEDIUM JUNKPILE.

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    53.9,   41.4,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .00
  ***CASUALTY*** ID:   1 IN LNK   6. PKF= .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .02
>>>       .110 UNIT FROM ID   3 AT TGT. PT.   16 HAD A MED  FAILURE AT TIME   720.00  <<<

%%TIMER%%  FINISHED REPLIC.  10. CPUTIM=     9.674.  TOP OF MEMORY ( ITOP ) =  52590


 <***> BEGINNING REPLICATION   17.   RND. NO. SEEDS =   94370626.  281628303.  115658448.       4999.       5999. <***>


** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    -9.3,   34.5,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .30

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (   -11.9,   28.2,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .21

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (   -24.5,   33.3,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000  0.0000   .3000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .15

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    -7.3,   19.9,    0.0 )
        ..JUNK CAS.. ID:   2 AT (   20.0,   50.0).   TOTAL JUNK FURTHER DAMAGED =      .044

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .16

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    -5.6,   10.8,    0.0 )
  ***CASUALTY*** ID:   7 IN LNK   9. PKF= 1.00 PK*# AT TGTPT    1 (    0.0,    0.0) =  1.00
  ***CASUALTY*** ID:   4 IN LNK   4. PKF= .30 PK*# AT TGTPT    2 (    0.0,    0.0) =  .30
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT    3 (    0.0,    0.0) =  .30
  ***CASUALTY*** ID:   6 IN LNK   5. PKF= .30 PK*# AT TGTPT    4 (    0.0,    0.0) =  .30
  ***CASUALTY*** ID:  10 IN LNK  95. PKF= 1.00 PK*# AT TGTPT    6 (    0.0,    1.0) =  2.00
        ..JUNK CAS.. ID:   2 AT (   20.0,   50.0).   TOTAL JUNK FURTHER DAMAGED =      .031

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .07

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    -5.5,   12.3,    0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF= .30 PK*# AT TGTPT    2 (    0.0,    0.0) =  .21
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT    3 (    0.0,    0.0) =  .21
  ***CASUALTY*** ID:   6 IN LNK   5. PKF= .30 PK*# AT TGTPT    4 (    0.0,    0.0) =  .21
        ..JUNK CAS.. ID:   2 AT (   20.0,   50.0).   TOTAL JUNK FURTHER DAMAGED =      .022

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .05

%%TIMER%%  FINISHED REPLIC.  17. CPUTIM=     9.964.  TOP OF MEMORY ( ITOP ) =  52590
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 <****> BEGINNING REPLICATION   18.   RND. NO. SEEDS =  1328936231.  281628303.  945264352.       4999.       5999. <****>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME   420.00  <<<
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   16 HAD A LITE FAILURE AT TIME  1320.00  <<<

%%TIMER%%  FINISHED REPLIC.  18. CPUTIM=    13.229.  TOP OF MEMORY ( ITOP ) =  52590


 <****> BEGINNING REPLICATION   19.   RND. NO. SEEDS =  1943180064.  281628303. 1180610459.       4999.       5999. <****>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME   420.00  <<<
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   16 HAD A LITE FAILURE AT TIME   780.00  <<<
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   16 HAD A LITE FAILURE AT TIME  1260.00  <<<

%%TIMER%%  FINISHED REPLIC.  19. CPUTIM=    10.523.  TOP OF MEMORY ( ITOP ) =  52590


 <****> BEGINNING REPLICATION   20.   RND. NO. SEEDS =   266658477.  281628303.  302976001.       4999.       5999. <****>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.   13 HAD A DEAD FAILURE AT TIME   180.00  <<<

%%TIMER%%  FINISHED REPLIC.  20. CPUTIM=    10.943.  TOP OF MEMORY ( ITOP ) =  52590


 <****> BEGINNING REPLICATION   21.   RND. NO. SEEDS =  1945926830.  281628303.  350057194.       4999.       5999. <****>


** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    1.1,   92.6,    0.0 )

                  <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .30
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME  1020.00  <<<

%%TIMER%%  FINISHED REPLIC.  21. CPUTIM=    11.146.  TOP OF MEMORY ( ITOP ) =  52590


 <****> BEGINNING REPLICATION   22.   RND. NO. SEEDS =   911779129.  382681688.  345583245.       4999.       5999. <****>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME   121.00  <<<

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   200.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (   58.1,   57.2,    0.0 )

                  <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .26
  ***CASUALTY*** ID:  13 IN LNK   8. PKF= 1.00 PK*# AT TGTPT   15 (   60.0,   60.0) =  1.00
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                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   1.0000  0.0000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= 1.00 PK*# AT TGTPT   16 (   60.0,   60.0) =  1.00
  ***CASUALTY*** ID:  12 IN LNK   7. PKF= 1.00 PK*# AT TGTPT   17 (   60.0,   60.0) =  1.00
  ***CASUALTY*** ID:   1 IN LNK   6. PKF= 1.00 PK*# AT TGTPT   18 (   60.0,   60.0) =   .40

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    40.5,   57.9,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .18

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .19

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    66.6,   60.6,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000  0.0000   .3000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .13

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    30.0,   56.4,    0.0 )
  ***CASUALTY*** ID:   9 IN LNK   1. PKF= 1.00 PK*# AT TGTPT   10 (   20.0,   50.0) =  1.00
  ***CASUALTY*** ID:  10 IN LNK   1. PKF= 1.00 PK*# AT TGTPT   10 (   20.0,   50.0) =  4.03
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   11 (   20.0,   50.0) =  .13
        ..JUNK CAS.. ID:   2 AT (   20.0,   50.0).   TOTAL JUNK FURTHER DAMAGED =      .174

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   .3000  0.0000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .09

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    46.9,   22.0,    0.0 )
        ..JUNK CAS.. ID:   2 AT (   20.0,   50.0).   TOTAL JUNK FURTHER DAMAGED =      .027

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .06

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    29.2,   47.7,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .09
        ..JUNK CAS.. ID:   2 AT (   20.0,   50.0).   TOTAL JUNK FURTHER DAMAGED =      .141

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   .3000  0.0000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .04

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    31.9,   54.7,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .06
        ..JUNK CAS.. ID:   2 AT (   20.0,   50.0).   TOTAL JUNK FURTHER DAMAGED =      .098

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   .3000  0.0000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .03

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    33.1,   63.2,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .04
        ..JUNK CAS.. ID:   2 AT (   20.0,   50.0).   TOTAL JUNK FURTHER DAMAGED =      .009

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .02

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    26.8,   59.9,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .03
        ..JUNK CAS.. ID:   2 AT (   20.0,   50.0).   TOTAL JUNK FURTHER DAMAGED =      .075

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   .3000  0.0000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .02

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    25.1,   30.5,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .02

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
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  ***CASUALTY*** ID:    2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .01

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    24.3,   30.5,    0.0 )
  ***CASUALTY*** ID:    1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .01

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:    2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .01
** THREAT TO REPAIR OF    .119 UNITS OF ID   2 AT COORDS    10.0,   10.0
                  PKS = 0.000, .300, .300, AND RN =  .193
                        MEDIUM. PUT INTO MEDIUM JUNKPILE.

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    52.2,   45.7,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:    2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .01

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    35.8,   57.9,    0.0 )
  ***CASUALTY*** ID:    1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .01

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:    2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .00

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    31.7,   15.9,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:    2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .00

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    36.3,   32.8,    0.0 )
  ***CASUALTY*** ID:    1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .01

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    34.2,   39.3,    0.0 )
  ***CASUALTY*** ID:    1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .01

%%TIMER%%  FINISHED REPLIC.  22. CPUTIM=    11.433.  TOP OF MEMORY ( ITOP ) =  52590

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 <***> BEGINNING REPLICATION   23.   RND. NO. SEEDS =  1047864717.  414454806.  672843765.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   16 HAD A LITE FAILURE AT TIME   121.00  <<<

%%TIMER%%  FINISHED REPLIC.  23. CPUTIM=    11.387.  TOP OF MEMORY ( ITOP ) =  52590



 <***> BEGINNING REPLICATION   24.   RND. NO. SEEDS =   339864612.  554306496.  877328013.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   16 HAD A LITE FAILURE AT TIME   121.00  <<<

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    11.4,  -33.8,    0.0 )
** THREAT TO REPAIR OF    .119 UNITS OF ID   3 AT COORDS    10.0,   10.0
                  PKS = 0.000, .300, .300, AND RN =  .207
                        MEDIUM. PUT INTO MEDIUM JUNKPILE.

%%TIMER%%  FINISHED REPLIC.  24. CPUTIM=    11.983.  TOP OF MEMORY ( ITOP ) =  52590
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 <***> BEGINNING REPLICATION   25.   RND. NO. SEEDS =  1943824406.  445217586. 1386130364.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME   121.00  <<<
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME   900.00  <<<

%%TIMER%%  FINISHED REPLIC.  25. CPUTIM=    12.256.  TOP OF MEMORY ( ITOP ) =  52590


 <***> BEGINNING REPLICATION   26.   RND. NO. SEEDS =   126197256.  445217586.  627966403.       4999.       5999. <***>


** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (   -10.4,    83.6,    0.0 )

                  <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK** AT TGTPT   13 (   20.0,   50.0) =   .30
>>>       .714 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME   540.00  <<<
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   16 HAD A LITE FAILURE AT TIME   900.00  <<<

%%TIMER%%  FINISHED REPLIC.  26. CPUTIM=    12.661.  TOP OF MEMORY ( ITOP ) =  52590


 <***> BEGINNING REPLICATION   27.   RND. NO. SEEDS =  1548272202.  445217586.  655681068.       4999.       5999. <***>


%%TIMER%%  FINISHED REPLIC.  27. CPUTIM=    12.098.  TOP OF MEMORY ( ITOP ) =  52590


 <***> BEGINNING REPLICATION   28.   RND. NO. SEEDS =  1171535499.  445217586. 1013636971.       4999.       5999. <***>


** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    31.9,    48.8,    0.0 )
  ***CASUALTY*** ID:  11 IN LNK  12. PKF= 1.00 PK** AT TGTPT    9 (   20.0,   50.0) =  1.00
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK** AT TGTPT   11 (   20.0,   50.0) =   .18
  ***CASUALTY*** ID:   9 IN LNK   3. PKF= 1.00 PK** AT TGTPT   12 (   20.0,   50.0) =   .60

                  <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   .3000  0.0000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK** AT TGTPT   13 (   20.0,   50.0) =   .30

                  <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK** AT TGTPT   16 (   60.0,   60.0) =   .30

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    57.3,    15.6,    0.0 )

                  <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK** AT TGTPT   16 (   60.0,   60.0) =   .21

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    40.8,    49.4,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK** AT TGTPT   11 (   20.0,   50.0) =   .13
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                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .21
        ..JUNK CAS.. ID:   3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =       .153

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000  0.0000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .15
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .12

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    [illegible].9,   41.8,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .15
        ..JUNK CAS.. ID:   3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =       .107

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000  0.0000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .10
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .08

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    89.9,   46.3,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .07

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    76.4,   25.7,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .05

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    77.7,   48.5,    0.0 )
        ..JUNK CAS.. ID:   3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =       .112

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000  0.0000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .04
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .06

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   105.0,   46.8,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .02

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    23.2,   42.4,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .09
        ..JUNK CAS.. ID:   2 AT (   20.0,   50.0).   TOTAL JUNK FURTHER DAMAGED =       .107

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000  0.0000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .10

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .02

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    29.2,   24.7,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .07

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .01

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    29.0,   46.4,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .06
        ..JUNK CAS.. ID:   2 AT (   20.0,   50.0).   TOTAL JUNK FURTHER DAMAGED =       .097

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000  0.0000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .05
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                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .01

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    19.9,    16.6,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .04

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    33.6,    50.7,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .04
        ..JUNK CAS.. ID:   2 AT (   20.0,   50.0).   TOTAL JUNK FURTHER DAMAGED =       .078

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   .3000  0.0000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .02

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .01

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    60.7,    54.7,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .02
  ***CASUALTY*** ID:   9 IN LNK   3. PKF= 1.00 PK*# AT TGTPT   14 (   60.0,   60.0) =   .40
  ***CASUALTY*** ID:  13 IN LNK   8. PKF= 1.00 PK*# AT TGTPT   15 (   60.0,   60.0) =  1.00
        ..JUNK CAS.. ID:   3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =       .099

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   .3000  0.0000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .00
  ***CASUALTY*** ID:  12 IN LNK   7. PKF= 1.00 PK*# AT TGTPT   17 (   60.0,   60.0) =  1.00
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .04

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    85.5,    22.0,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .00

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    49.3,    14.6,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .01

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .00

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    33.7,    55.0,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .3) PK*# AT TGTPT   11 (   20.0,   50.0) =   .03
        ..JUNK CAS.. ID:   2 AT (   20.0,   50.0).   TOTAL JUNK FURTHER DAMAGED =       .064

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   .3000  0.0000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .01

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    25.4,    19.2,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .3) PK*# AT TGTPT   13 (   20.0,   50.0) =   .01

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    36.7,    24.4,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .3) PK*# AT TGTPT   13 (   20.0,   50.0) =   .00

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    44.1,    33.3,    0.0 )
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                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK** AT TGTPT   13 (   20.0,   50.0) =   .00

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    46.8,   48.8,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK** AT TGTPT   13 (   20.0,   50.0) =   .00
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK** AT TGTPT   18 (   60.0,   60.0) =   .03

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    26.0,   50.2,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK** AT TGTPT   11 (   20.0,   50.0) =   .02

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    55.9,   45.4,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK** AT TGTPT   16 (   60.0,   60.0) =   .02

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    54.3,   53.1,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK** AT TGTPT   18 (   60.0,   60.0) =   .01

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    48.0,   45.5,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK** AT TGTPT   18 (   60.0,   60.0) =   .01

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    26.0,   29.8,    0.0 )
  ***  SUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK** AT TGTPT   11 (   20.0,   50.0) =   .01

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 )  AGZ = (   -16.9,   -9.4,    0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK** AT TGTPT    2 (    0.0,    0.0) =   .30
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK** AT TGTPT    3 (    0.0,    0.0) =   .30
  ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK** AT TGTPT    4 (    0.0,    0.0) =   .30
>>>       .163 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME  1020.00  <<<
>>>       .235 UNIT FROM ID   3 AT TGT. PT.   16 HAD A LITE FAILURE AT TIME  1260.00  <<<

%%TIMER%%  FINISHED REPLIC.  28. CPUTIM=    13.228.  TOP OF MEMORY ( ITOP ) =  52590

<****> BEGINNING REPLICATION   29.   RND. NO. SEEDS =    59667837.   69134011.  471112141.       4999.       5999. <****>

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 )  AGZ = (     8.8,   43.8,    0.0 )
  ***CASUALTY*** ID:  11 IN LNK  12. PKF= 1.00 PK** AT TGTPT    9 (   20.0,   50.0) =  1.00
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK** AT TGTPT   11 (   20.0,   50.0) =   .18
  ***CASUALTY*** ID:   9 IN LNK   3. PKF= 1.00 PK** AT TGTPT   12 (   20.0,   50.0) =   .60

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   .3000  0.0000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK** AT TGTPT   13 (   20.0,   50.0) =   .30

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 )  AGZ = (   -13.4,   16.5,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000  0.0000   .3000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK** AT TGTPT   13 (   20.0,   50.0) =   .21

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 )  AGZ = (    22.1,   49.5,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF= 1.00 PK** AT TGTPT   11 (   20.0,   50.0) =   .42
       ..JUNK CAS.. ID:   2 AT (   20.0,   50.0).   TOTAL JUNK FURTHER DAMAGED =       .210

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   1.0000  0.0000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= 1.00 PK** AT TGTPT   13 (   20.0,   50.0) =   .49

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK** AT TGTPT   16 (   60.0,   60.0) =   .30
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** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    54.3,    46.1,    0.0 )
        ..JUNK CAS.. ID:   3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =        .090

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000  0.0000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .21
  ***CASUALTY*** ID:   1 IN LNK   6. PKF= .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .12

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    24.3,    58.9,    0.0 )

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .15

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    36.1,    34.1,    0.0 )

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .10

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    48.9,    29.6,    0.0 )

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .07

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    18.5,    36.4,    0.0 )

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .05

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    59.4,    22.7,    0.0 )

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .04

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    56.7,    19.4,    0.0 )

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .02

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    36.5,    13.6,    0.0 )

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000  0.0000   .3000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .02

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    56.2,    21.0,    0.0 )
        ..JUNK CAS.. ID:   3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =        .005

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .01

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (     7.0,    18.5,    0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF= .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .30
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .30
  ***CASUALTY*** ID:   6 IN LNK   5. PKF= .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .30

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    38.9,    25.5,    0.0 )

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .01

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    43.6,    18.2,    0.0 )

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .01

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    -8.7,    17.0,    0.0 )
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  ***CASUALTY*** ID:    4 IN LNK    4. PKF=  .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .21
  ***CASUALTY*** ID:    5 IN LNK   95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .21
  ***CASUALTY*** ID:    6 IN LNK    5. PKF=  .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .21

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    64.1,    32.5,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:    3 IN LNK   11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .00

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    66.9,    50.1,    0.0 )
  ***CASUALTY*** ID:    9 IN LNK    3. PKF= 1.00 PK*# AT TGTPT   14 (   60.0,   60.0) =   .40
  ***CASUALTY*** ID:   13 IN LNK    8. PKF= 1.00 PK*# AT TGTPT   15 (   60.0,   60.0) =  1.00
        ..JUNK CAS.. ID:    3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =       .207

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000  0.0000  0.0000
  ***CASUALTY*** ID:    3 IN LNK   11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .00
  ***CASUALTY*** ID:   12 IN LNK    7. PKF= 1.00 PK*# AT TGTPT   17 (   60.0,   60.0) =  1.00
  ***CASUALTY*** ID:    1 IN LNK    6. PKF=  .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .08

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    17.7,    45.0,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:    3 IN LNK   11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .00

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    49.2,    53.0,    0.0 )
  ***CASUALTY*** ID:    1 IN LNK    6. PKF=  .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .06

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    64.0,    43.6,    0.0 )
  ***CASUALTY*** ID:    1 IN LNK    6. PKF=  .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .04

%%TIMER%%  FINISHED REPLIC.  29. CPUTIM=    13.535.  TOP OF MEMORY ( ITOP ) =  5259C

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 <***> BEGINNING REPLICATION   30.   RND. NO. SEEDS =  1278320123.   69134011. 2085729072.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME   121.00  <<<
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME   900.00  <<<
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   16 HAD A MED  FAILURE AT TIME  1380.00  <<<

%%TIMER%%  FINISHED REPLIC.  30. CPUTIM=    13.824.  TOP OF MEMORY ( ITOP ) =  52590


 <***> BEGINNING REPLICATION   31.   RND. NO. SEEDS =  2089597170.   69134011. 2089511501.       4999.       5999. <***>


** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    24.1,    83.3,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:    2 IN LNK   10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .30

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:    3 IN LNK   11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .30
  ***CASUALTY*** ID:    5 IN LNK   95. PKF=  .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .30
  ***CASUALTY*** ID:    8 IN LNK   13. PKF= 1.00 PK*# AT TGTPT   20 (   20.0,   80.0) =  1.00
  ***CASUALTY*** ID:   10 IN LNK   95. PKF= 1.00 PK*# AT TGTPT   21 (   20.0,   80.0) =  2.00
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** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    90.7,   78.8,    0.0 )

                  <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .21

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    95.2,   88.2,    0.0 )

                  <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .15

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    38.1,  100.0,    0.0 )

                  <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .10

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    74.4,  109.3,    0.0 )

                  <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .07

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    75.3,   97.0,    0.0 )

                  <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .05

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   107.9,   76.5,    0.0 )

                  <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .04

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    65.7,   83.2,    0.0 )
        ..JUNK CAS.. ID:   3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =      .275

                  <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   .3000  0.0000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .02
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .12

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    81.6,   88.9,    0.0 )

                  <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .02

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    52.1,  104.1,    0.0 )

                  <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .01

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    28.2,   93.9,    0.0 )

                  <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .21

                  <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .01
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .21

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    32.2,   78.3,    0.0 )

                  <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .15

                  <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .01
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .15
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** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (    40.0,    40.0,     0.0 )  AGZ = (    59.2,    97.8,     0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000    .3000   0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,    60.0) =    .00

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (    40.0,    40.0,     0.0 )  AGZ = (    85.8,    92.2,     0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000    .3000   0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,    60.0) =    .00

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (    40.0,    40.0,     0.0 )  AGZ = (    92.8,    82.5,     0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000    .3000   0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,    60.0) =    .00

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME    300.00. DGZ = (     0.0,     0.0,     0.0 )  AGZ = (   111.8,    63.4,     0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   0.0000    .3000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,    60.0) =    .07
>>>       .464 UNIT FROM ID   3 AT TGT. PT.   16 HAD A LITE FAILURE AT TIME   840.00  <<<
>>>       .355 UNIT FROM ID   2 AT TGT. PT.   13 HAD A MED  FAILURE AT TIME  1140.00  <<<

%%TIMER%%  FINISHED REPLIC.  31. CPUTIM=    14.477.  TOP OF MEMORY ( ITOP ) =  52590



 <***> BEGINNING REPLICATION   32.   RND. NO. SEEDS =  1553507112. 1527637642. 1572366251.       4999.       5999. <***>


** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (    40.0,    40.0,     0.0 )  AGZ = (    75.4,     7.7,     0.0 )
  ***CASUALTY*** ID:  10 IN LNK  95. PKF= 1.00 PK*# AT TGTPT    5 (   80.0,     0.0) =   2.00

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (    40.0,    40.0,     0.0 )  AGZ = (     2.7,    -8.9,     0.0 )
  ***CASUALTY*** ID:   7 IN LNK   9. PKF= 1.00 PK*# AT TGTPT    1 (    0.0,     0.0) =  1.00
  ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK*# AT TGTPT    2 (    0.0,     0.0) =   .30
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,     0.0) =   .30
  ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK*# AT TGTPT    4 (    0.0,     0.0) =   .30
  ***CASUALTY*** ID:  10 IN LNK  95. PKF= 1.00 PK*# AT TGTPT    6 (    0.0,     1.0) =  2.00

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (    40.0,    40.0,     0.0 )  AGZ = (    16.6,    -4.7,     0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK*# AT TGTPT    2 (    0.0,     0.0) =   .21
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,     0.0) =   .21
  ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK*# AT TGTPT    4 (    0.0,     0.0) =   .21

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (    40.0,    40.0,     0.0 )  AGZ = (   -11.9,    -9.4,     0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK*# AT TGTPT    2 (    0.0,     0.0) =   .15
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,     0.0) =   .15
  ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK*# AT TGTPT    4 (    0.0,     0.0) =   .15

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (    40.0,    40.0,     0.0 )  AGZ = (    18.3,    -1.7,     0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK*# AT TGTPT    2 (    0.0,     0.0) =   .10
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,     0.0) =   .10
  ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK*# AT TGTPT    4 (    0.0,     0.0) =   .10

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (    40.0,    40.0,     0.0 )  AGZ = (    -4.4,    -1.4,     0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK*# AT TGTPT    2 (    0.0,     0.0) =   .07
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,     0.0) =   .07
  ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK*# AT TGTPT    4 (    0.0,     0.0) =   .07

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (    40.0,    40.0,     0.0 )  AGZ = (    15.6,     .5,     0.0 )
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  ***CASUALTY*** ID:    4 IN LNK    4. PKF=  .30 PK** AT TGTPT     2 (     0.0,     0.0) =   .05
  ***CASUALTY*** ID:    5 IN LNK   95. PKF=  .30 PK** AT TGTPT     3 (     0.0,     0.0) =   .05
  ***CASUALTY*** ID:    6 IN LNK    5. PKF=  .30 PK** AT TGTPT     4 (     0.0,     0.0) =   .05

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (    40.0,    40.0,     0.0 )  AGZ = (    -7.1,     2.5,     0.0 )
  ***CASUALTY*** ID:    4 IN LNK    4. PKF=  .30 PK** AT TGTPT     2 (     0.0,     0.0) =   .04
  ***CASUALTY*** ID:    5 IN LNK   95. PKF=  .30 PK** AT TGTPT     3 (     0.0,     0.0) =   .04
  ***CASUALTY*** ID:    6 IN LNK    5. PKF=  .30 PK** AT TGTPT     4 (     0.0,     0.0) =   .04
>>>       1.000 UNIT FROM ID    2 AT TGT. PT.    13 HAD A LITE FAILURE AT TIME  1380.00  <<<

%%TIMER%%  FINISHED REPLIC.  32. CPUTIM=     14.731.  TOP OF MEMORY ( ITOP ) =  52590


 <***> BEGINNING REPLICATION   33.   RND. NO. SEEDS =  1295971427. 1527637642.  671232737.       4999.       5999. <***>


>>>       1.000 UNIT FROM ID    3 AT TGT. PT.    16 HAD A LITE FAILURE AT TIME    61.00  <<<
>>>       1.000 UNIT FROM ID    2 AT TGT. PT.    13 HAD A DEAD FAILURE AT TIME   360.00  <<<
>>>       1.000 UNIT FROM ID    3 AT TGT. PT.    16 HAD A LITE FAILURE AT TIME   720.00  <<<
>>>       1.000 UNIT FROM ID    3 AT TGT. PT.    16 HAD A LITE FAILURE AT TIME  1020.00  <<<

%%TIMER%%  FINISHED REPLIC.  33. CPUTIM=     15.143.  TOP OF MEMORY ( ITOP ) =  52590


 <***> BEGINNING REPLICATION   34.   RND. NO. SEEDS =   583173523. 1527637642. 1003989602.       4999.       5999. <***>

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>>>       1.000 UNIT FROM ID    2 AT TGT. PT.    13 HAD A DEAD FAILURE AT TIME   121.00  <<<

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME    300.00. DGZ = (     0.0,     0.0,     0.0 )  AGZ = (    13.4,   -14.2,     0.0 )
  ***CASUALTY*** ID:    4 IN LNK    4. PKF=  .30 PK** AT TGTPT     2 (     0.0,     0.0) =   .30
  ***CASUALTY*** ID:    5 IN LNK   95. PKF=  .30 PK** AT TGTPT     3 (     0.0,     0.0) =   .30
  ***CASUALTY*** ID:    6 IN LNK    5. PKF=  .30 PK** AT TGTPT     4 (     0.0,     0.0) =   .30

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME    300.00. DGZ = (     0.0,     0.0,     0.0 )  AGZ = (     7.3,   -18.2,     0.0 )
  ***CASUALTY*** ID:    4 IN LNK    4. PKF=  .30 PK** AT TGTPT     2 (     0.0,     0.0) =   .21
  ***CASUALTY*** ID:    5 IN LNK   95. PKF=  .30 PK** AT TGTPT     3 (     0.0,     0.0) =   .21
  ***CASUALTY*** ID:    6 IN LNK    5. PKF=  .30 PK** AT TGTPT     4 (     0.0,     0.0) =   .21

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME    300.00. DGZ = (     0.0,     0.0,     0.0 )  AGZ = (    10.0,    -7.0,     0.0 )
  ***CASUALTY*** ID:    7 IN LNK    9. PKF= 1.00 PK** AT TGTPT     1 (     0.0,     0.0) =  1.00
  ***CASUALTY*** ID:    4 IN LNK    4. PKF=  .30 PK** AT TGTPT     2 (     0.0,     0.0) =   .15
  ***CASUALTY*** ID:    5 IN LNK   95. PKF=  .30 PK** AT TGTPT     3 (     0.0,     0.0) =   .15
  ***CASUALTY*** ID:    6 IN LNK    5. PKF=  .30 PK** AT TGTPT     4 (     0.0,     0.0) =   .15
  ***CASUALTY*** ID:   10 IN LNK   95. PKF= 1.00 PK** AT TGTPT     6 (     0.0,     1.0) =   .67

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME    300.00. DGZ = (     0.0,     0.0,     0.0 )  AGZ = (     5.0,   -14.7,     0.0 )
  ***CASUALTY*** ID:    4 IN LNK    4. PKF=  .30 PK** AT TGTPT     2 (     0.0,     0.0) =   .10
  ***CASUALTY*** ID:    5 IN LNK   95. PKF=  .30 PK** AT TGTPT     3 (     0.0,     0.0) =   .10
  ***CASUALTY*** ID:    6 IN LNK    5. PKF=  .30 PK** AT TGTPT     4 (     0.0,     0.0) =   .10

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME    300.00. DGZ = (     0.0,     0.0,     0.0 )  AGZ = (    10.6,   -14.7,     0.0 )
  ***CASUALTY*** ID:    4 IN LNK    4. PKF=  .30 PK** AT TGTPT     2 (     0.0,     0.0) =   .07
  ***CASUALTY*** ID:    5 IN LNK   95. PKF=  .30 PK** AT TGTPT     3 (     0.0,     0.0) =   .07
  ***CASUALTY*** ID:    6 IN LNK    5. PKF=  .30 PK** AT TGTPT     4 (     0.0,     0.0) =   .07

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME    300.00. DGZ = (     0.0,     0.0,     0.0 )  AGZ = (    -7.3,    -9.2,     0.0 )
  ***CASUALTY*** ID:    4 IN LNK    4. PKF=  .30 PK** AT TGTPT     2 (     0.0,     0.0) =   .05
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  ***CASUALTY*** ID:    5 IN LNK  95. PKF=  .30 PK*# AT TGTPT     3 (    0.0,    0.0) =   .05
  ***CASUALTY*** ID:    6 IN LNK   5. PKF=  .30 PK*# AT TGTPT     4 (    0.0,    0.0) =   .05

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME    300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    2.2,   -9.3,    0.0 )
  ***CASUALTY*** ID:    4 IN LNK   4. PKF=  .30 PK*# AT TGTPT     2 (    0.0,    0.0) =   .04
  ***CASUALTY*** ID:    5 IN LNK  95. PKF=  .30 PK*# AT TGTPT     3 (    0.0,    0.0) =   .04
  ***CASUALTY*** ID:    6 IN LNK   5. PKF=  .30 PK*# AT TGTPT     4 (    0.0,    0.0) =   .04

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME    300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (   16.4,   -5.4,    0.0 )
  ***CASUALTY*** ID:    4 IN LNK   4. PKF=  .30 PK*# AT TGTPT     2 (    0.0,    0.0) =   .02
  ***CASUALTY*** ID:    5 IN LNK  95. PKF=  .30 PK*# AT TGTPT     3 (    0.0,    0.0) =   .02
  ***CASUALTY*** ID:    6 IN LNK   5. PKF=  .30 PK*# AT TGTPT     4 (    0.0,    0.0) =   .02

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME    300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    4.1,   -6.9,    0.0 )
  ***CASUALTY*** ID:    4 IN LNK   4. PKF=  .30 PK*# AT TGTPT     2 (    0.0,    0.0) =   .02
  ***CASUALTY*** ID:    5 IN LNK  95. PKF=  .30 PK*# AT TGTPT     3 (    0.0,    0.0) =   .02
  ***CASUALTY*** ID:    6 IN LNK   5. PKF=  .30 PK*# AT TGTPT     4 (    0.0,    0.0) =   .02
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   16 HAD A LITE FAILURE AT TIME   840.00  <<<

%%TIMER%%  FINISHED REPLIC.  34. CPUTIM=    15.423.  TOP OF MEMORY ( ITOP ) =  52590


 <***> BEGINNING REPLICATION   35.   RND. NO. SEEDS =   17234911C. 1527637642. 1877883366.       4999.       5999. <***>


** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   13.2,   27.8,    0.0 )
  ***CASUALTY*** ID:    1 IN LNK   6. PKF=  .30 PK*# AT TGTPT    11 (   20.0,   50.0) =   .18

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:    2 IN LNK  10. PKF=  .30 PK*# AT TGTPT    13 (   20.0,   50.0) =   .30

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   11.0,   26.9,    0.0 )
  ***CASUALTY*** ID:    1 IN LNK   6. PKF=  .30 PK*# AT TGTPT    11 (   20.0,   50.0) =   .13

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:    2 IN LNK  10. PKF=  .30 PK*# AT TGTPT    13 (   20.0,   50.0) =   .21

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    2.8,   26.7,    0.0 )

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:    2 IN LNK  10. PKF=  .30 PK*# AT TGTPT    13 (   20.0,   50.0) =   .15

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   55.4,   21.5,    0.0 )

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:    2 IN LNK  10. PKF=  .30 PK*# AT TGTPT    13 (   20.0,   50.0) =   .10

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:    3 IN LNK  12. PKF=  .30 PK*# AT TGTPT    16 (   60.0,   60.0) =   .30

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   78.1,   19.2,    0.0 )

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:    3 IN LNK  12. PKF=  .30 PK*# AT TGTPT    16 (   60.0,   60.0) =   .21

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   45.8,   55.3,    0.0 )

                     <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:    2 IN LNK  10. PKF=  .30 PK*# AT TGTPT    13 (   20.0,   50.0) =   .07
        ..JUNK CAS.. ID:    3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =      .153
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                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000  0.0000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .15
  ***CASUALTY*** ID:   1 IN LNK   6. PKF= .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .12

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    86.4,   26.3,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .10

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    22.2,   39.1,    0.0 )
  ***CASUALTY*** ID:  11 IN LNK  12. PKF=1.00 PK*# AT TGTPT    9 (   20.0,   50.0) =  1.00
  ***CASUALTY*** ID:   1 IN LNK   6. PKF= .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .09
  ***CASUALTY*** ID:   9 IN LNK   3. PKF=1.00 PK*# AT TGTPT   12 (   20.0,   50.0) =   .60
        ..JUNK CAS.. ID:   2 AT (   20.0,   50.0).   TOTAL JUNK FURTHER DAMAGED =      .250

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000  0.0000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .05

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .07

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    92.6,   55.4,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .05

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    10.7,   16.2,    0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF= .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .30
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .30
  ***CASUALTY*** ID:   6 IN LNK   5. PKF= .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .30

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .04

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    12.5,   28.9,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF= .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .06

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .02

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    25.5,   57.3,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF= .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .04
        ..JUNK CAS.. ID:   2 AT (   20.0,   50.0).   TOTAL JUNK FURTHER DAMAGED =      .193

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000  0.0000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .02

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .04

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    62.6,   26.2,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .02

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    64.0,   18.4,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .02

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    49.2,   51.9,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
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   ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .01
          ..JUNK CAS.. ID:   3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =       .198

                      <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000  0.0000  0.0000
   ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .01
   ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .08

 ** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    77.9,   60.7,    0.0 )
          ..JUNK CAS.. ID:   3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =       .139

                      <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000  0.0000  0.0000
   ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .01
   ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .06

 ** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    21.3,   37.8,    0.0 )
   ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .03
          ..JUNK CAS.. ID:   2 AT (   20.0,   50.0).   TOTAL JUNK FURTHER DAMAGED =       .139

                      <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000  0.0000  0.0000
   ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .01

                      <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
   ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .01

 ** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    74.1,   41.8,    0.0 )
          ..JUNK CAS.. ID:   3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =       .099

                      <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000  0.0000  0.0000
   ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .00
   ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .04

 ** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (     3.8,   60.0,    0.0 )
   ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .02

                      <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
   ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .01

 ** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (     4.9,   47.5,    0.0 )
   ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .01

                      <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
   ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .00

 ** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    56.6,   40.2,    0.0 )

                      <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
   ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .00
          ..JUNK CAS.. ID:   3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =       .069

                      <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000  0.0000  0.0000
   ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .00
   ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .03

 ** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (     2.9,   39.8,    0.0 )
   ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .01

                      <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
   ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .00

 ** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    67.5,   29.8,    0.0 )

                      <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
   ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .00
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** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (    40.0,    40.0,     0.0 )  AGZ = (     17.2,    35.0,     0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF= .30 PK*# AT TGTPT   11 (   20.0,    50.0) =    .01

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (    40.0,    40.0,     0.0 )  AGZ = (      5.8,    18.2,     0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF= .30 PK*# AT TGTPT    2 (    0.0,     0.0) =    .21
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT    3 (    0.0,     0.0) =    .21
  ***CASUALTY*** ID:   6 IN LNK   5. PKF= .30 PK*# AT TGTPT    4 (    0.0,     0.0) =    .21

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (    40.0,    40.0,     0.0 )  AGZ = (     56.5,    42.7,     0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF= .30 PK*# AT TGTPT   18 (   60.0,    60.0) =    .02

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (    40.0,    40.0,     0.0 )  AGZ = (     19.8,    47.9,     0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF= 1.00 PK*# AT TGTPT   11 (   20.0,    50.0) =    .02

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (    40.0,    40.0,     0.0 )  AGZ = (     82.1,    49.0,     0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF= .30 PK*# AT TGTPT   18 (   60.0,    60.0) =    .01

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (    40.0,    40.0,     0.0 )  AGZ = (     68.1,    51.9,     0.0 )
  ***CASUALTY*** ID:   9 IN LNK   3. PKF= 1.00 PK*# AT TGTPT   14 (   60.0,    60.0) =    .40
  ***CASUALTY*** ID:  13 IN LNK   8. PKF= 1.00 PK*# AT TGTPT   15 (   60.0,    60.0) =   1.00
  ***CASUALTY*** ID:  12 IN LNK   7. PKF= 1.00 PK*# AT TGTPT   17 (   60.0,    60.0) =   1.00
  ***CASUALTY*** ID:   1 IN LNK   6. PKF= .30 PK*# AT TGTPT   16 (   60.0,    60.0) =    .01

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME      1.00. DGZ = (    40.0,    40.0,     0.0 )  AGZ = (     44.5,    53.2,     0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF= .30 PK*# AT TGTPT   18 (   60.0,    60.0) =    .01

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME    300.00. DGZ = (     0.0,     0.0,     0.0 )  AGZ = (    -20.8,    59.1,     0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000    .3000   0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,    50.0) =    .01

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME    300.00. DGZ = (     0.0,     0.0,     0.0 )  AGZ = (     13.6,    44.2,     0.0 )
  ***CASUALTY*** ID:  10 IN LNK   1. PKF= 1.00 PK*# AT TGTPT   10 (   20.0,    50.0) =   2.00
  ***CASUALTY*** ID:   1 IN LNK   5. PKF= .30 PK*# AT TGTPT   11 (   20.0,    50.0) =    .00

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000   0.0000   0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,    50.0) =    .01

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000    .3000   0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,    60.0) =    .00
** THREAT TO REPAIR OF     .150 UNITS OF ID   3 AT COORDS     10.0,    10.0
                    PKS = 0.000, .300, .300, AND RN =  .035
                          MEDIUM. PUT INTO MEDIUM JUNKPILE.

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME    300.00. DGZ = (     0.0,     0.0,     0.0 )  AGZ = (     50.0,    43.9,     0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000    .3000   0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,    50.0) =    .01

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000   0.0000   0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,    60.0) =    .00

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME    300.00. DGZ = (     0.0,     0.0,     0.0 )  AGZ = (     33.3,    47.6,     0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF= .30 PK*# AT TGTPT   11 (   20.0,    50.0) =    .00

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000   0.0000   0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,    50.0) =    .00
** THREAT TO REPAIR OF     .303 UNITS OF ID   2 AT COORDS     10.0,    10.0
                    PKS = 0.000, .300, .300, AND RN =  .096
                          MEDIUM. PUT INTO MEDIUM JUNKPILE.

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME    300.00. DGZ = (     0.0,     0.0,     0.0 )  AGZ = (     66.1,    40.6,     0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000    .3000   0.0000
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  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .00

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (   21.5,   73.0,    0.0 )
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .22
  ***CASUALTY*** ID:  10 IN LNK  95. PKF= 1.00 PK*# AT TGTPT   21 (   20.0,   80.0) =  1.33

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (   21.4,   65.3,    0.0 )
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .16

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    5.1,   75.0,    0.0 )
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .11

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    3.5,   75.7,    0.0 )
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .08

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (   35.1,   82.2,    0.0 )
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .05

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (   15.9,   69.5,    0.0 )
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .04

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (   19.1,   80.6,    0.0 )
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= 1.00 PK*# AT TGTPT   19 (   20.0,   80.0) =   .09
>>>       .323 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME   900.00  <<<
>>>       .323 UNIT FROM ID   2 AT TGT. PT.   13 HAD A DEAD FAILURE AT TIME  1320.00  <<<

ZZTIMERZZ  FINISHED REPLIC.  35. CPUTIM=    15.740.  TOP OF MEMORY ( ITOP ) =  52590


 <***> BEGINNING REPLICATION   36.   RND. NO. SEEDS =  144428582C.  207194759.  736011940.       4999.       5999. <***>


** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   -6.5,    7.0,    0.0 )
  ***CASUALTY*** ID:   7 IN LNK   9. PKF= 1.00 PK*# AT TGTPT    1 (    0.0,    0.0) =  1.00
  ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .30
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .30
  ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .30
  ***CASUALTY*** ID:  10 IN LNK  95. PKF= 1.00 PK*# AT TGTPT    6 (    0.0,    1.0) =  2.00

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   -7.8,  -15.6,    0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .21
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .21
  ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .21

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    4.0,   13.2,    0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .15
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .15
  ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .15

                  <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .30

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   28.3,   12.4,    0.0 )

                  <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .21

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   17.8,    5.7,    0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .10
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .10
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  ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .10

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .3) PK*# AT TGTPT   13 (   20.0,   50.0) =   .15

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   -2.6,    3.4,    0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .07
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .07
  ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .07

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   38.0,   15.8,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .10

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .30

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   19.7,   10.7,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .07

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   -3.6,  -12.6,    0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .05
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .05
  ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .05

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   14.1,    2.6,    0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .04
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .04
  ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .04

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   0.0000   .3000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .05

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    9.6,   16.8,    0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .02
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .02
  ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .02
        ..JUNK CAS.. ID:   2 AT (   20.0,   50.0).   TOTAL JUNK FURTHER DAMAGED =       .015

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .04

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   22.3,    6.6,    0.0 )
        ..JUNK CAS.. ID:   2 AT (   20.0,   50.0).   TOTAL JUNK FURTHER DAMAGED =       .011

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .02

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   29.9,    6.2,    0.0 )
        ..JUNK CAS.. ID:   2 AT (   20.0,   50.0).   TOTAL JUNK FURTHER DAMAGED =       .007

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .02

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   13.2,   13.9,    0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .02
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .02
  ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .02
        ..JUNK CAS.. ID:   2 AT (   20.0,   50.0).   TOTAL JUNK FURTHER DAMAGED =       .005

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
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  ***CASUALTY*** ID:    2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .01
>>>       .081 UNIT FROM ID   2 AT TGT. PT.   13 HAD A MED  FAILURE AT TIME   300.00  <<<
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   16 HAD A MED  FAILURE AT TIME   960.00  <<<

%%TIMER%%  FINISHED REPLIC.  36. CPUTIM=    10.052.  TOP OF MEMORY ( ITOP ) =  52590


 <***> BEGINNING REPLICATION   37.   RND. NO. SEEDS =  1388756147. 1262311699. 1829301448.       4999.       5999. <***>


** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    16.3,   63.0,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .18

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000  0.0000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .30

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .30
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .30

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    10.7,   74.6,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .21

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000  0.0000   .3000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .21
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .21
  ***CASUALTY*** ID:   8 IN LNK  13. PKF= 1.00 PK*# AT TGTPT   20 (   20.0,   80.0) =  1.00
  ***CASUALTY*** ID:  10 IN LNK  95. PKF= 1.00 PK*# AT TGTPT   21 (   20.0,   80.0) =  2.00

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    -1.8,   60.6,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .13

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .15

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (     8.9,   58.6,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .09
        ..JUNK CAS.. ID:   2 AT (   20.0,   50.0).   TOTAL JUNK FURTHER DAMAGED =      .107

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    .3000  0.0000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .10
        ..JUNK CAS.. ID:   3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =      .063

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .15

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    -4.3,   73.6,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .07

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (     5.6,   76.1,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .05
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .15

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    15.0,   98.5,    0.0 )
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  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .3) PK*# AT TGTPT   19 (   20.0,   80.0) =   .10

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    15.4,   93.9,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .3) PK*# AT TGTPT   13 (   20.0,   50.0) =   .04
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .3) PK*# AT TGTPT   19 (   20.0,   80.0) =   .07

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    21.0,   53.6,    0.0 )
  ***CASUALTY*** ID:  11 IN LNK  12. PKF= 1.00 PK*# AT TGTPT    9 (   20.0,   50.0) =  1.00
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .3) PK*# AT TGTPT   11 (   20.0,   50.0) =   .06
  ***CASUALTY*** ID:   9 IN LNK   3. PKF= 1.00 PK*# AT TGTPT   12 (   20.0,   50.0) =   .60
        ..JUNK CAS.. ID:   2 AT (   20.0,   50.0).   TOTAL JUNK FURTHER DAMAGED =       .122

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   .3000  0.0000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .3) PK*# AT TGTPT   13 (   20.0,   50.0) =   .02
        ..JUNK CAS.. ID:   3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =       .044

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .3) PK*# AT TGTPT   16 (   60.0,   60.0) =   .10

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    33.7,   67.4,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .3) PK*# AT TGTPT   11 (   20.0,   50.0) =   .04

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .3) PK*# AT TGTPT   13 (   20.0,   50.0) =   .02
        ..JUNK CAS.. ID:   3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =       .031

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .3) PK*# AT TGTPT   16 (   60.0,   60.0) =   .07
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .3) PK*# AT TGTPT   19 (   20.0,   80.0) =   .05

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   -17.0,   65.5,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .3) PK*# AT TGTPT   13 (   20.0,   50.0) =   .01

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    30.0,   68.1,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .3) PK*# AT TGTPT   11 (   20.0,   50.0) =   .03

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .3) PK*# AT TGTPT   13 (   20.0,   50.0) =   .01
        ..JUNK CAS.. ID:   3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =       .022

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .3) PK*# AT TGTPT   16 (   60.0,   60.0) =   .05
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .3) PK*# AT TGTPT   19 (   20.0,   80.0) =   .04

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    -1.5,   89.3,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .3) PK*# AT TGTPT   13 (   20.0,   50.0) =   .01

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (     8.0,   82.0,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .3) PK*# AT TGTPT   13 (   20.0,   50.0) =   .00
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .3) PK*# AT TGTPT   19 (   20.0,   80.0) =   .02

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    12.3,   60.5,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .3) PK*# AT TGTPT   11 (   20.0,   50.0) =   .02
        ..JUNK CAS.. ID:   2 AT (   20.0,   50.0).   TOTAL JUNK FURTHER DAMAGED =       .100

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   .3000  0.0000  0.0000
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   ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK**  AT TGTPT   13 (   20.0,   50.0) =   .00
         ..JUNK CAS.. ID:   3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =        .015

                      <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
   ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK**  AT TGTPT   16 (   60.0,   60.0) =   .04

 ** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    23.3,   58.5,    0.0 )
   ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .3. PK**  AT TGTPT   11 (   20.0,   50.0) =   .01
         ..JUNK CAS.. ID:   2 AT (   20.0,   50.0).   TOTAL JUNK FURTHER DAMAGED =        .070

                      <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   .3000  0.0000  0.0000
   ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK**  AT TGTPT   13 (   20.0,   50.0) =   .00
         ..JUNK CAS.. ID:   3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =        .011

                      <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
   ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK**  AT TGTPT   16 (   60.0,   60.0) =   .02

 ** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    24.8,   96.0,    0.0 )
         ..JUNK CAS.. ID:   3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =        .007

                      <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
   ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK**  AT TGTPT   16 (   60.0,   60.0) =   .02
   ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK**  AT TGTPT   19 (   20.0,   80.0) =   .02

 ** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    36.5,   75.9,    0.0 )
         ..JUNK CAS.. ID:   3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =        .005

                      <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
   ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK**  AT TGTPT   16 (   60.0,   60.0) =   .01
   ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK**  AT TGTPT   19 (   20.0,   80.0) =   .01

 ** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (     1.7,   84.1,    0.0 )
   ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK**  AT TGTPT   19 (   20.0,   80.0) =   .01

 ** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (     5.3,   85.2,    0.0 )
   ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK**  AT TGTPT   19 (   20.0,   80.0) =   .01

 ** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    15.6,   70.8,    0.0 )
   ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK**  AT TGTPT   11 (   20.0,   50.0) =   .01

                      <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
   ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK**  AT TGTPT   16 (   60.0,   60.0) =   .01
   ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK**  AT TGTPT   19 (   20.0,   80.0) =   .00

 ** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (     8.3,   53.5,    0.0 )
   ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK**  AT TGTPT   11 (   20.0,   50.0) =   .01

 ** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (     8.1,   62.2,    0.0 )
   ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK**  AT TGTPT   11 (   20.0,   50.0) =   .01

                      <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000  0.0000   .3000
   ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK**  AT TGTPT   16 (   60.0,   60.0) =   .01

 ** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    31.5,   77.2,    0.0 )

                      <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
   ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK**  AT TGTPT   16 (   60.0,   60.0) =   .00
   ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK**  AT TGTPT   19 (   20.0,   80.0) =   .00

 ** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    37.0,  101.6,    0.0 )

                      <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
   ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK**  AT TGTPT   16 (   60.0,   60.0) =   .00
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** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    6.8,   26.0,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .00
** THREAT TO REPAIR OF    .295 UNITS OF ID   3 AT COORDS    10.0,   10.0
                  PKS =  .300,  .300,  .300, AND RN =  .240
                      DESTROYED.  REMOVED FROM SHOP.

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (  -20.9,   24.8,    0.0 )
** THREAT TO REPAIR OF    .150 UNITS OF ID   2 AT COORDS    10.0,   10.0
                  PKS =  .300,  .300,  .300, AND RN =  .157
                      MEDIUM. PUT INTO MEDIUM JUNKPILE.

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    7.3,   13.9,    0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF= .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .30
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .15
  ***CASUALTY*** ID:   6 IN LNK   5. PKF= .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .30
  ***CASUALTY*** ID:  12 IN LNK   2. PKF= 1.00 PK*# AT TGTPT    8 (   10.0,   10.0) =   .99

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .00

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (   -3.5,    2.1,    0.0 )
  ***CASUALTY*** ID:   7 IN LNK   9. PKF= 1.00 PK*# AT TGTPT    1 (    0.0,    0.0) =  1.00
  ***CASUALTY*** ID:   4 IN LNK   4. PKF= .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .21
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .11
  ***CASUALTY*** ID:   6 IN LNK   5. PKF= .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .21

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    7.3,    4.9,    0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF= .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .15
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .07
  ***CASUALTY*** ID:   6 IN LNK   5. PKF= .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .15

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    8.8,   29.7,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   8. PKF= .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .07

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (   -3.2,   15.1,    0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF= .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .10
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .05
  ***CASUALTY*** ID:   6 IN LNK   5. PKF= .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .10

%%TIMER%%  FINISHED REPLIC.  37. CPUTIM=    16.443.  TOP OF MEMORY ( ITOP ) =  52590


 <***> BEGINNING REPLICATION   38.   RND. NO. SEEDS =   633636237.  337987587. 1772898681.       4999.       5999. <***>


** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   84.4,   -8.5,    0.0 )
  ***CASUALTY*** ID:  10 IN LNK  95. PKF= 1.00 PK*# AT TGTPT    5 (   80.0,    0.0) =  2.00
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME   600.00  <<<
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME  1260.00  <<<

%%TIMER%%  FINISHED REPLIC.  38. CPUTIM=    16.725.  TOP OF MEMORY ( ITOP ) =  52590


 <***> BEGINNING REPLICATION   39.   RND. NO. SEEDS =   659337110.  337987587. 1468027671.       4999.       5999. <***>
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** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    96.8,   87.2,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  21. PKF=  .30 PK**# AT TGTPT   16 (   60.0,   60.0) =   .30

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    80.1,   96.0,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK**# AT TGTPT   16 (   60.0,   60.0) =   .21

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    46.9,   74.7,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF=  .30 PK**# AT TGTPT   13 (   20.0,   50.0) =   .30
        ..JUNK CAS.. ID:   3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =       .153

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   .3000  0.0000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK**# AT TGTPT   16 (   60.0,   60.0) =   .15
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK**# AT TGTPT   18 (   60.0,   60.0) =   .12

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    74.2,   85.6,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK**# AT TGTPT   16 (   60.0,   60.0) =   .10

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    96.3,   87.0,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK**# AT TGTPT   16 (   60.0,   60.0) =   .07

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    56.9,   81.3,    0.0 )
        ..JUNK CAS.. ID:   3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =       .160

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   .3000  0.0000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK**# AT TGTPT   16 (   60.0,   60.0) =   .05
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK**# AT TGTPT   18 (   60.0,   60.0) =   .08

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    51.7,  109.9,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK**# AT TGTPT   16 (   60.0,   60.0) =   .04

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    59.6,  105.7,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK**# AT TGTPT   16 (   60.0,   60.0) =   .02

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    92.3,   91.2,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK**# AT TGTPT   16 (   60.0,   60.0) =   .02

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    55.3,  100.6,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK**# AT TGTPT   16 (   60.0,   60.0) =   .01

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    74.9,   89.2,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK**# AT TGTPT   16 (   60.0,   60.0) =   .01
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** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    92.4,   98.8,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .01

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    51.1,  106.6,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .00

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    72.6,   81.6,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .00

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    84.1,   79.5,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .00

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    72.6,   80.4,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .06

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    73.4,   73.8,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .04

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    76.1,   75.1,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .03
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.   13 HAD A MED  FAILURE AT TIME  1320.00  <<<
>>>       .485 UNIT FROM ID   3 AT TGT. PT.   16 HAD A LITE FAILURE AT TIME  1380.00  <<<

%%TIMER%%  FINISHED REPLIC.  39. CPUTIM=    17.082.  TOP OF MEMORY ( ITOP ) =  52590



 <***> BEGINNING REPLICATION   40.   RND. NO. SEEDS =   143039118.   15458225.  123838394.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   16 HAD A LITE FAILURE AT TIME    61.00  <<<
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   16 HAD A LITE FAILURE AT TIME   480.00  <<<
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME  1140.00  <<<

%%TIMER%%  FINISHED REPLIC.  40. CPUTIM=    17.395.  TOP OF MEMORY ( ITOP ) =  52590



 <***> BEGINNING REPLICATION   41.   RND. NO. SEEDS =  1931422525.   15458225. 1868975148.       4999.       5999. <***>


%%TIMER%%  FINISHED REPLIC.  41. CPUTIM=    17.626.  TOP OF MEMORY ( ITOP ) =  52590



 <***> BEGINNING REPLICATION   42.   RND. NO. SEEDS =   520728607.   15458225.  626570577.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   16 HAD A LITE FAILURE AT TIME   240.00  <<<
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>>>      1.000 UNIT FROM ID   2 AT TGT. PT.   13 HAD A MED  FAILURE AT TIME  1200.00  <<<
>>>       .006 UNIT FROM ID   2 AT TGT. PT.   13 HAD A MED  FAILURE AT TIME  1380.00  <<<

%%TIMER%%  FINISHED REPLIC.  42. CPUTIM=    17.914.  TOP OF MEMORY ( ITOP ) =  52590


 <***> BEGINNING REPLICATION   43.   RND. NO. SEEDS =  1558176207. 1454620621.  224755416.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   16 HAD A LITE FAILURE AT TIME    61.00  <<<
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME   121.00  <<<
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   16 HAD A LITE FAILURE AT TIME   370.00  <<<
>>>       .031 UNIT FROM ID   3 AT TGT. PT.   16 HAD A LITE FAILURE AT TIME   480.00  <<<
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   16 HAD A MED  FAILURE AT TIME  1020.00  <<<
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME  1140.00  <<<

%%TIMER%%  FINISHED REPLIC.  43. CPUTIM=    16.386.  TOP OF MEMORY ( ITOP ) =  52590


 <***> BEGINNING REPLICATION   44.   RND. NO. SEEDS =   660923458. 242857830. 1888831029.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   16 HAD A LITE FAILURE AT TIME   420.00  <<<
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   16 HAD A LITE FAILURE AT TIME   900.00  <<<
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.   13 HAD A MED  FAILURE AT TIME  1140.00  <<<
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   16 HAD A DEAD FAILURE AT TIME  1380.00  <<<

%%TIMER%%  FINISHED REPLIC.  44. CPUTIM=    18.690.  TOP OF MEMORY ( ITOP ) =  52590


 <***> BEGINNING REPLICATION   45.   RND. NO. SEEDS =   351650423. 242857830.  553206486.       4999.       5999. <***>


** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (   101.4,    68.8,    0.0 )

                  <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .3) PK** AT TGTPT   16 (   60.0,   60.0) =   .30

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    98.9,    48.1,    0.0 )

                  <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .3) PK** AT TGTPT   16 (   60.0,   60.0) =   .21

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (    82.1,    84.3,    0.0 )

                  <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .3) PK** AT TGTPT   16 (   60.0,   60.0) =   .15

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (   101.6,    71.3,    0.0 )

                  <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .3) PK** AT TGTPT   16 (   60.0,   60.0) =   .10

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 )  AGZ = (   101.1,    64.1,    0.0 )
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                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .07

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    88.7,    77.5,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .05

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    90.2,    53.8,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .04

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    90.2,    58.9,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .02

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    92.6,    73.8,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .02

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    87.0,    75.2,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .01

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    78.4,    59.9,    0.0 )
       ..JUNK CAS.. ID:   3 AT (   60.0,   60.0).   TOTAL JUNK FURTHER DAMAGED =       .292

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   .3000  0.0000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .01
  ***CASUALTY*** ID:   1 IN LNK   6. PKF=  .30 PK*# AT TGTPT   18 (   60.0,   60.0) =   .12

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    94.3,    63.6,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .01

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    95.0,    67.3,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .00

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    76.6,    88.6,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .00

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    86.0,    41.8,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .00
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME   300.00  <<<
>>>       .728 UNIT FROM ID   2 AT TGT. PT.   13 HAD A MED  FAILURE AT TIME   900.00  <<<
>>>       .695 UNIT FROM ID   3 AT TGT. PT.   16 HAD A LITE FAILURE AT TIME  1080.00  <<<

%%TIMER%%  FINISHED REPLIC.  49. CPUTIM=    10.204.  TOP OF MEMORY ( ITOP ) =  52590
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 <***> BEGINNING REPLICATION   46.   RND. NO. SEEDS =   342729025.  242857830. 1424571554.       4999.       5999. <***>


>>>      1.000 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME   121.00  <<<
>>>      1.000 UNIT FROM ID   3 AT TGT. PT.   16 HAD A LITE FAILURE AT TIME   300.00  <<<

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    14.6,  -25.8,    0.0 )
** THREAT TO REPAIR OF    .119 UNITS OF ID   2 AT COORDS    10.0,   10.0
                  PKS = .000, .300, .300, AND RN =  .002
                        MEDIUM. PUT INTO MEDIUM JUNKPILE.

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    -.2,  -14.4,    0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK** AT TGTPT    2 (    0.0,    0.0) =  .30
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK** AT TGTPT    3 (    0.0,    0.0) =  .30
  ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK** AT TGTPT    4 (    0.0,    0.0) =  .30
>>>      1.000 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME  1080.00  <<<

%%TIMER%%  FINISHED REPLIC.  46. CPUTIM=    19.311.  TOP OF MEMORY ( ITOP ) =  52590


 <***> BEGINNING REPLICATION   47.   RND. NO. SEEDS =  1916060698.    4733776.   60431171.       4999.       5999. <***>


** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (     9.6,  -13.3,    0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK** AT TGTPT    2 (    0.0,    0.0) =  .30
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK** AT TGTPT    3 (    0.0,    0.0) =  .30
  ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK** AT TGTPT    4 (    0.0,    0.0) =  .30

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    13.5,  -13.8,    0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK** AT TGTPT    2 (    0.0,    0.0) =  .21
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK** AT TGTPT    3 (    0.0,    0.0) =  .21
  ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK** AT TGTPT    4 (    0.0,    0.0) =  .21

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    78.4,  -10.7,    0.0 )
  ***CASUALTY*** ID:  10 IN LNK  95. PKF= 1.00 PK** AT TGTPT    5 (   80.0,    0.0) =  2.00

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    12.2,   -9.1,    0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK** AT TGTPT    2 (    0.0,    0.0) =  .15
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK** AT TGTPT    3 (    0.0,    0.0) =  .15
  ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK** AT TGTPT    4 (    0.0,    0.0) =  .15

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (    11.8,   -6.7,    0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF=  .30 PK** AT TGTPT    2 (    0.0,    0.0) =  .10
  ***CASUALTY*** ID:   5 IN LNK  95. PKF=  .30 PK** AT TGTPT    3 (    0.0,    0.0) =  .10
  ***CASUALTY*** ID:   6 IN LNK   5. PKF=  .30 PK** AT TGTPT    4 (    0.0,    0.0) =  .10

%%TIMER%%  FINISHED REPLIC.  47. CPUTIM=    19.755.  TOP OF MEMORY ( ITOP ) =  52590


 <***> BEGINNING REPLICATION   48.   RND. NO. SEEDS =  1683678484.    4733776.  580897902.       4999.       5999. <***>


** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    78.7,  -11.6,    0.0 )
  ***CASUALTY*** ID:  10 IN LNK  95. PKF= 1.00 PK** AT TGTPT    5 (   80.0,    0.0) =  2.00
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** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (     0.0,     0.0,     0.0 ) AGZ = (    48.7,    10.6,     0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,    60.0) =   .30

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (     0.0,     0.0,     0.0 ) AGZ = (    45.9,     9.9,     0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000  0.0000   .3000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,    50.0) =   .30

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000  0.0000   .3000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,    60.0) =   .21
>>>       .869 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME   730.00  <<<
>>>       .647 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME   900.00  <<<
>>>       .700 UNIT FROM ID   3 AT TGT. PT.   16 HAD A LITE FAILURE AT TIME  1020.00  <<<

%%TIMER%%  FINISHED REPLIC.  48. CPUTIM=    20.276.  TOP OF MEMORY ( ITOP ) =  52590



 <***> BEGINNING REPLICATION   49.   RND. NO. SEEDS =  1777369412.    4733776.  211015260.       4999.       5999. <***>



** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (    40.0,    40.0,     0.0 ) AGZ = (    11.5,    89.1,     0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,    50.0) =   .30
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT   19 (   20.0,    80.0) =   .30
  ***CASUALTY*** ID:   8 IN LNK  13. PKF= 1.00 PK*# AT TGTPT   20 (   20.0,    80.0) =  1.00
  ***CASUALTY*** ID:  10 IN LNK  95. PKF= 1.00 PK*# AT TGTPT   21 (   20.0,    80.0) =  2.00

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (    40.0,    40.0,     0.0 ) AGZ = (    -4.4,    89.1,     0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,    50.0) =   .21

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (    40.0,    40.0,     0.0 ) AGZ = (    34.5,    91.1,     0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,    50.0) =   .15

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,    60.0) =   .30
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT   19 (   20.0,    80.0) =   .21

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (    40.0,    40.0,     0.0 ) AGZ = (    13.0,    92.5,     0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,    50.0) =   .10
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT   19 (   20.0,    80.0) =   .15

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (    40.0,    40.0,     0.0 ) AGZ = (    17.5,    86.3,     0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,    50.0) =   .07

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,    60.0) =   .21
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT   19 (   20.0,    80.0) =   .10

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (    40.0,    40.0,     0.0 ) AGZ = (    31.6,    89.5,     0.0 )
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                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .05

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .15
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .07

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   25.7,   89.9,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .04

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .10
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .05

** EMPL. # (VOLLEY)   1 (   1). WPN NO.  1. AT TIME     1.00. DGZ = (   40.0,   40.0,    0.0 ) AGZ = (   19.3,   84.4,    0.0 )

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   2 IN LNK  10. PKF= .30 PK*# AT TGTPT   13 (   20.0,   50.0) =   .02

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =   0.0000   .3000  0.0000
  ***CASUALTY*** ID:   3 IN LNK  11. PKF= .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .07
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT   19 (   20.0,   80.0) =   .04
>>>       .666 UNIT FROM ID   3 AT TGT. PT.   16 HAD A LITE FAILURE AT TIME   480.00  <<<
>>>       .058 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME   780.00  <<<

%%TIMER%%  FINISHED REPLIC.  49. CPUTIM=    20.917.  TOP OF MEMORY ( ITOP ) =  52590


 <****> BEGINNING REPLICATION   50.   RND. NO. SEEDS =   910o811C3.    4733776. 1985870623.       4999.       5999. <****>

>>>      1.000 UNIT FROM ID   2 AT TGT. PT.   13 HAD A LITE FAILURE AT TIME   300.00  <<<

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (   -1.0,   10.1,    0.0 )
  ***CASUALTY*** ID:   7 IN LNK   9. PKF= 1.00 PK*# AT TGTPT    1 (    0.0,    0.0) =  1.00
  ***CASUALTY*** ID:   4 IN LNK   4. PKF= .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .30
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .30
  ***CASUALTY*** ID:   6 IN LNK   5. PKF= .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .30
  ***CASUALTY*** ID:  10 IN LNK  95. PKF= 1.00 PK*# AT TGTPT    6 (    0.0,    1.0) =  2.00

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    6.6,   30.6,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF= .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .18

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (   -2.1,    9.1,    0.0 )
  ***CASUALTY*** ID:   4 IN LNK   4. PKF= .30 PK*# AT TGTPT    2 (    0.0,    0.0) =   .21
  ***CASUALTY*** ID:   5 IN LNK  95. PKF= .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .21
  ***CASUALTY*** ID:   6 IN LNK   5. PKF= .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .21

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    5.8,   31.0,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF= .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .13

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (   18.0,   25.8,    0.0 )
  ***CASUALTY*** ID:   1 IN LNK   6. PKF= .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .09

** EMPL. # (VOLLEY)   2 (   2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (   14.2,   44.1,    0.0 )
  ***CASUALTY*** ID:  11 IN LNK  12. PKF= 1.00 PK*# AT TGTPT    9 (   20.0,   50.0) =  1.00
  ***CASUALTY*** ID:   1 IN LNK   6. PKF= .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .06
  ***CASUALTY*** ID:   9 IN LNK   3. PKF= 1.00 PK*# AT TGTPT   12 (   20.0,   50.0) =   .60
```

```
                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000    .3000  0.0000
  ***CASUALTY*** ID:    3 IN LNK   11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .30

** EMPL. # (VOLLEY)    2 (    2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    8.3,   32.8,    0.0 )
  ***CASUALTY*** ID:    1 IN LNK    6. PKF=  .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .04

** EMPL. # (VOLLEY)    2 (    2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (   11.3,   10.1,    0.0 )
  ***CASUALTY*** ID:    4 IN LNK    4. PKF=  .3. PK*# AT TGTPT    2 (    0.0,    0.0) =   .15
  ***CASUALTY*** ID:    5 IN LNK   95. PKF=  .30 PK*# AT TGTPT    3 (    0.0,    0.0) =   .15
  ***CASUALTY*** ID:    6 IN LNK    5. PKF=  .30 PK*# AT TGTPT    4 (    0.0,    0.0) =   .15
  ***CASUALTY*** ID:   14 IN LNK   14. PKF= 1.00 PK*# AT TGTPT    7 (   10.0,   10.0) =100.00

** EMPL. # (VOLLEY)    2 (    2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (   16.5,   48.0,    0.0 )
  ***CASUALTY*** ID:    1 IN LNK    6. PKF=  .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .03

                    <> REPAIRABLE ITEM FOLLOWS. PK S (DEAD,MED.,LITE) =    0.0000    .3000  0.0000
  ***CASUALTY*** ID:    3 IN LNK   11. PKF=  .30 PK*# AT TGTPT   16 (   60.0,   60.0) =   .21

** EMPL. # (VOLLEY)    2 (    2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (    6.8,   44.8,    0.0 )
  ***CASUALTY*** ID:    1 IN LNK    6. PKF=  .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .02

** EMPL. # (VOLLEY)    2 (    2). WPN NO.  1. AT TIME   300.00. DGZ = (    0.0,    0.0,    0.0 ) AGZ = (   12.5,   33.3,    0.0 )
  ***CASUALTY*** ID:    1 IN LNK    6. PKF=  .30 PK*# AT TGTPT   11 (   20.0,   50.0) =   .01

%%TIMER%%  FINISHED PUBLIC.  50. CPUTIM=    21.252.  TOP OF MEMORY ( ITOP ) =  5259C
```

ENCOUNTER RESULTS - AVERAGED OVER 50 REPLICATIONS

FOURTH EXAMPLE RUN - CONVENTIONAL ATTACKS
RUN ID # 07/13/84 10.15.55.

**** REPEAT OF WARNINGS FROM THIS RUN ****

!!* WARNING *!*!* CAN NOT FIND ASSET OR LINK NAMED HANDLOAD DUMMY LINK CREATED

!!* WARNING *!*!* CAN NOT FIND ASSET OR LINK NAMED REPAIR DUMMY LINK CREATED

*** WARNING *** LINK HANDLOAD HAS NO CORRESPONDINGLY NAMED ASSET - ASSUMING DUMMY LINK

*** WARNING *** LINK REPAIR HAS NO CORRESPONDINGLY NAMED ASSET - ASSUMING DUMMY LINK

*** EFFECTIVENESS VS. TIME ***

FREQUENCY DISTRIBUTION OF RESULTS

TIME	EFFECTIVENESS	OPR CHNS	100	90-99	80-89	70-79	60-69	50-59	40-49	30-39	20-29	10-19	1-9	0
0.00	1.00 +/- .000	1	50	0	0	0	0	0	0	0	0	0	0	0
11.00	.75 +/- .061	1	32	0	0	1	0	6	3	0	1	1	3	3
61.00	.75 +/- .049	1	28	0	0	7	1	3	3	0	1	1	6	0
121.00	.70 +/- .046	1	20	0	0	14	1	4	3	0	1	1	6	0
190.00	.70 +/- .045	1	18	0	0	16	2	3	3	0	1	1	6	0
240.00	.69 +/- .044	1	16	0	0	18	1	5	2	0	1	1	6	0
310.00	.55 +/- .052	1	13	0	0	7	4	9	3	0	1	2	5	6
370.00	.60 +/- .050	1	15	0	0	7	6	3	6	1	2	2	6	2
420.00	.58 +/- .043	1	12	0	0	11	5	5	4	1	2	2	6	2
480.00	.58 +/- .043	1	12	0	0	11	4	4	6	1	2	2	6	2
550.00	.58 +/- .048	1	12	0	0	12	4	6	3	1	2	2	6	2
600.00	.59 +/- .047	1	11	0	0	14	3	7	2	1	2	2	6	2
660.00	.60 +/- .049	1	14	0	0	11	4	6	2	1	2	2	6	2
730.00	.57 +/- .050	1	16	0	0	6	7	4	4	1	2	2	6	2
780.00	.60 +/- .049	1	15	0	0	7	7	6	2	1	2	2	6	2
840.00	.61 +/- .050	1	15	0	0	8	7	4	2	1	2	2	6	2
910.00	.59 +/- .048	1	12	0	0	10	8	4	3	1	2	2	6	2
960.00	.60 +/- .048	1	13	0	0	10	8	4	2	1	2	2	6	2
1020.00	.59 +/- .048	1	12	0	0	11	6	4	4	1	2	2	6	2
1090.00	.59 +/- .046	1	13	0	0	11	6	4	3	1	2	2	6	2
1140.00	.59 +/- .047	1	14	0	0	8	8	3	4	1	2	2	6	2
1200.00	.59 +/- .048	1	13	0	0	9	8	2	5	1	2	2	6	2
1270.00	.58 +/- .047	1	11	0	0	13	6	4	3	1	2	2	6	2
1320.00	.59 +/- .046	1	10	0	0	14	8	3	2	1	2	2	6	2
1380.00	.59 +/- .047	1	10	0	0	14	8	1	4	1	2	2	6	2
1440.00	.59 +/- .047	1	10	0	0	16	6	2	3	1	2	2	6	2

```
ASSET SURVIVORS - INCLUDING CONTAMINATED - VS. TIME FOR REPLICATION    0
*******************************************************************************

        .TRUCK .FKLFT .CRANE .RADIO .ALARM .TELE   .R/T OP.LOADMS.DRIVER.MEN    .FKLFT .CRANE .RIGGER.PARTS .
        .      .      .      .      .      .      .      .TR    .      .      .OP    .OP    .      .      .
        .      .      .      .      .      .      .      .      .      .      .      .      .      .      .
  TIME  .   1  .   2  .   3  .   4  .   5  .   6  .   7  .   8  .   9  .  10  .  11  .  12  .  13  .  14  .
...........................................................................................................
   0.00   1.00    1.00   1.00   1.00   2.00   1.00   1.00   1.00   1.00   6.00   1.00   1.00   1.00 100.00
  11.00   [illegible] .79    .75    .91   1.82    .91    .94    .90    .91   5.48    .90    .92    .92  98.00
  61.00    .89     .77    .69    .91   1.82    .91    .94    .90    .91   5.48    .90    .92    .92  98.00
 121.00    .89     .63    .64    .91   1.82    .91    .94    .90    .91   5.48    .90    .92    .92  97.99
 190.00    .89     .61    .68    .91   1.82    .91    .94    .90    .91   5.48    .90    .92    .92  97.92
 240.00    .89     .63    .70    .91   1.82    .91    .94    .90    .91   5.48    .90    .92    .92  97.82
 310.00    .81     .53    .63    .83   1.70    .83    .86    .88    .86   5.14    .86    .86    .86  95.70
 370.00    .81     .53    .62    .83   1.70    .83    .86    .88    .86   5.14    .86    .86    .86  95.64
 420.00    .81     .50    .62    .83   1.70    .83    .86    .88    .86   5.14    .86    .86    .86  95.60
 480.00    .81     .51    .59    .83   1.70    .83    .86    .88    .86   5.14    .86    .86    .86  95.54
 550.00    .81     .53    .62    .83   1.70    .83    .85    .88    .86   5.14    .86    .86    .86  95.47
 600.00    .81     .55    .66    .83   1.70    .83    .85    .88    .86   5.14    .86    .86    .86  95.40
 650.00    .81     .59    .69    .83   1.70    .83    .86    .88    .86   5.14    .86    .86    .86  95.32
 730.00    .81     .61    .68    .83   1.70    .83    .86    .88    .86   5.14    .86    .86    .86  95.26
 780.00    .81     .63    .67    .83   1.70    .83    .86    .88    .86   5.14    .86    .86    .86  95.22
 840.00    .81     .63    .67    .83   1.70    .83    .86    .88    .86   5.14    .86    .86    .86  95.17
 910.00    .81     .57    .64    .83   1.70    .83    .85    .88    .86   5.14    .86    .86    .86  95.12
 960.00    .81     .59    .65    .83   1.70    .83    .86    .88    .86   5.14    .86    .86    .86  95.07
1020.00    .81     .61    .62    .83   1.70    .83    .86    .88    .86   5.14    .86    .86    .86  95.00
1090.00    .81     .59    .64    .83   1.70    .83    .86    .88    .86   5.14    .86    .86    .86  94.93
1140.00    .81     .53    .66    .83   1.70    .83    .86    .88    .86   5.14    .86    .86    .86  94.88
1200.00    .81     .55    .67    .83   1.70    .83    .86    .88    .86   5.14    .86    .86    .86  94.81
1270.00    .81     .58    .67    .83   1.70    .83    .86    .86    .86   5.14    .86    .86    .86  94.73
1320.00    .81     .58    .66    .83   1.70    .83    .86    .88    .86   5.14    .86    .86    .86  94.69
1380.00    .81     .58    .63    .83   1.70    .83    .86    .88    .86   5.14    .86    .86    .86  94.65
1440.00    .81     .62    .66    .83   1.70    .83    .86    .88    .86   5.14    .86    .86    .86  94.58

LINK RESULTS VS. TIME FOR REPLICATION    0

KEY: LINE1 = # OF ACTUAL USES ( INCL. = 0 IF NOT IN CPLNK )
     LINE2 = # OF TIMES WEAK BECAUSE ASSETS UNAVAILABLE
     LINE3 = # OF TIMES WEAK, LIMITED BY NO. ALLOWED IN LINK
     LINE4 = # OF TIMES = 0 IN COMPOUND LNK ( THUS NOT COUNTED IN LINE1 )
     LINE5 = # OF AS-AVAILABLE USES ( AS IN REPAIR )
     LINE6 = NO. TIMES LIMITING IN AS-AVAILABLE USES
***********************************************************
        .HANDLO.REPAIR.DRIVER.RADIO .TELE   .TRUCK .CRANE .RIGGER.R/T OP.FKLFT  .CRANE  .FKLFT .LOADMS.PARTS .
        .AD    .      .      .      .      .      .OP    .      .      .      .      .OP    .TR    .      .
        .      .      .      .      .      .      .      .      .      .      .      .      .      .      .
  TIME  .   1  .   2  .   3  .   4  .   5  .   6  .   7  .   8  .   9  .  10  .  11  .  12  .  13  .  14  .
...........................................................................................................
   0.00 .   0      0      0     50      0     50     50     50     50     50     50     50     50      0
        .   0      0      0      0      0      0      0      0      0      0      0      0      0      0
        .   0      0      0      0      0      0      0      0      0      0      0      0      0      0
        .   0      0      0      0      0      0      0      0      0      0      0      0      0      0
        .   0      0      0      0      0      0      0      0      0      0      0      0      0      0
        .   0      0      0      0      0      0      0      0      0      0      0      0      0      0

  11.00 .   9      7      0     50      0     50     34     34     50     38     34     38     50      7
        .   2<<    5<<    0      2<<    0      5<<    0      0      3<<    0      0      0      0      0
        .   0      0      0      0      0      0      0      0      0      0      0      0      0      0
        .   0      0      0      0      0      0      0      0      0      0      2<<    0      0      0
        .   0      3      0      0      0      0      0      0      0      0      0      0      0      3
```

	0	14<<	0	0	0	0	0	0	0	0	0	0	0	1<<
61.00	12	12	0	50	0	50	32	32	50	38	32	38	50	10
	4<<	1<<	0	5<<	0	6<<	0	0	0	1<<	0	0	5<<	0
	0	0	0	0	0	0	1<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	3<<	0	0	0
	0	18	0	0	0	0	0	0	0	0	0	0	0	18
	0	13<<	0	0	0	0	0	0	0	0	0	0	0	1<<
121.00	19	12	0	50	0	50	31	31	50	31	31	31	50	12
	11<<	1<<	0	5<<	0	6<<	0	0	0	1<<	1<<	0	6<<	0
	0	0	0	0	0	0	1<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	3<<	0	0	0
	0	24	0	0	0	0	0	0	0	0	0	0	0	24
	0	14<<	0	0	0	0	0	0	0	0	0	0	0	1<<
190.00	20	12	0	50	0	50	33	33	50	30	33	30	50	12
	13<<	1<<	0	5<<	0	6<<	0	0	0	1<<	3<<	0	6<<	0
	0	0	0	0	0	0	1<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	0	25	0	0	0	0	0	0	0	0	0	0	0	25
	0	15<<	0	0	0	0	0	0	0	0	0	0	0	1<<
240.00	20	15	0	50	0	50	32	32	50	30	32	30	50	15
	13<<	1<<	0	5<<	0	6<<	0	0	0	1<<	3<<	0	8<<	0
	0	0	0	0	0	0	2<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	0	23	0	0	0	0	0	0	0	0	0	0	0	23
	0	16<<	0	0	0	0	0	0	0	0	0	0	0	1<<
310.00	15	17	0	50	0	50	23	23	50	29	23	29	50	17
	9<<	6<<	0	4<<	0	8<<	1<<	0	5<<	2<<	3<<	0	3<<	0
	0	0	0	0	0	0	2<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	2<<	0	0	0
	0	25	0	0	0	0	0	0	0	0	0	0	0	25
	0	24<<	0	0	0	0	0	0	0	0	0	0	0	2<<
370.00	21	14	0	50	0	50	29	29	50	27	29	27	50	14
	11<<	1<<	0	9<<	0	9<<	0	0	0	2<<	3<<	0	3<<	0
	0	0	0	0	0	0	3<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	4<<	0	0	0
	0	29	0	0	0	0	0	0	0	0	0	0	0	29
	0	22<<	0	0	0	0	0	0	0	0	0	0	0	2<<
420.00	22	14	0	50	0	50	30	30	50	26	30	26	50	14
	13<<	1<<	0	10<<	0	9<<	0	0	0	1<<	5<<	0	4<<	0
	0	0	0	0	0	0	2<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	2<<	0	0	0
	0	30	0	0	0	0	0	0	0	0	0	0	0	30
	0	22<<	0	0	0	0	0	0	0	0	0	0	0	2<<
480.00	23	14	0	50	0	50	29	29	50	25	29	25	50	14
	14<<	1<<	0	10<<	0	9<<	0	0	0	1<<	6<<	0	3<<	0
	0	0	0	0	0	0	1<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	3<<	0	0	0
	0	34	0	0	0	0	0	0	0	0	0	0	0	34
	0	22<<	0	0	0	0	0	0	0	0	0	0	0	2<<
550.00	22	13	0	50	0	50	32	32	50	26	32	26	50	13
	14<<	0	0	10<<	0	9<<	0	0	0	2<<	8<<	0	3<<	0
	0	0	0	0	0	0	2<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	30	0	0	0	0	0	0	0	0	0	0	0	30
	0	23<<	0	0	0	0	0	0	0	0	0	0	0	2<<

600.00	20	15	0	50	0	50	30	30	50	28	30	28	50	15
	13<<	0	0	10<<	0	9<<	0	0	0	2<<	8<<	0	5<<	0
	0	0	0	0	0	0	2<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	27	0	0	0	0	0	0	0	0	0	0	0	27
	0	24<<	0	0	0	0	0	0	0	0	0	0	0	2<<
660.00	20	12	0	50	0	50	32	32	50	28	32	28	50	12
	13<<	0	0	10<<	0	9<<	0	0	0	1<<	7<<	0	3<<	0
	0	0	0	0	0	0	2<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	0	22	0	0	0	0	0	0	0	0	0	0	0	22
	0	23<<	0	0	0	0	0	0	0	0	0	0	0	2<<
730.00	19	12	0	50	0	50	32	32	50	29	32	29	50	12
	12<<	1<<	0	10<<	0	9<<	1<<	0	0	1<<	6<<	0	1<<	0
	0	0	0	0	0	0	2<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	2<<	0	0	0
	0	19	0	0	0	0	0	0	0	0	0	0	0	19
	0	23<<	0	0	0	0	0	0	0	0	0	0	0	2<<
780.00	15	14	0	50	0	50	29	29	50	33	29	33	50	14
	9<<	1<<	0	10<<	0	9<<	0	0	0	2<<	7<<	0	4<<	0
	0	0	0	0	0	0	2<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	0	16	0	0	0	0	0	0	0	0	0	0	0	16
	0	19<<	0	0	0	0	0	0	0	0	0	0	0	2<<
840.00	15	13	0	50	0	50	29	29	50	33	29	33	50	13
	7<<	1<<	0	10<<	0	10<<	0	0	0	2<<	5<<	0	4<<	0
	0	0	0	0	0	0	2<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	0	17	0	0	0	0	0	0	0	0	0	0	0	17
	0	18<<	0	0	0	0	0	0	0	0	0	0	0	2<<
910.00	19	14	0	50	0	50	26	26	50	29	26	29	50	14
	11<<	1<<	0	10<<	0	10<<	0	0	0	2<<	5<<	0	4<<	0
	0	0	0	0	0	0	2<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	3<<	0	0	0
	0	19	0	0	0	0	0	0	0	0	0	0	0	19
	0	18<<	0	0	0	0	0	0	0	0	0	0	0	2<<
960.00	18	11	0	50	0	50	30	30	50	30	30	30	50	11
	10<<	1<<	0	10<<	0	10<<	0	0	0	2<<	5<<	0	3<<	0
	0	0	0	0	0	0	3<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	0	20	0	0	0	0	0	0	0	0	0	0	0	20
	0	18<<	0	0	0	0	0	0	0	0	0	0	0	2<<
1020.00	19	12	0	50	0	50	27	27	50	29	27	29	50	12
	11<<	0	0	10<<	0	10<<	0	0	0	2<<	3<<	0	4<<	0
	0	0	0	0	0	0	4<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	3<<	0	0	0
	0	23	0	0	0	0	0	0	0	0	0	0	0	23
	0	19<<	0	0	0	0	0	0	0	0	0	0	0	2<<
1090.00	20	14	0	50	0	50	30	30	50	28	30	28	50	14
	9<<	0	0	10<<	0	10<<	0	0	0	2<<	4<<	0	5<<	0
	0	0	0	0	0	0	4<<	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0	2<<	0	0	0
	0	20	0	0	0	0	0	0	0	0	0	0	0	20
	0	20<<	0	0	0	0	0	0	0	0	0	0	0	2<<

1140.00	. 21	11	0	50	0	50	33	33	50	27	33	27	50	11
	. 11<<	1<<	0	10<<	0	10<<	0	0	0	3<<	6<<	0	1<<	0
	. 0	0	0	0	0	0	3<<	0	0	0	0	0	0	0
	. 0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	. 0	22	0	0	0	0	0	0	0	0	0	0	0	22
	. 0	19<<	0	0	0	0	0	0	0	0	0	0	0	2<<
1200.00	. 21	12	0	50	0	50	33	33	50	27	33	27	50	12
	. 12<<	1<<	0	10<<	0	10<<	0	0	0	2<<	6<<	0	2<<	0
	. 0	0	0	0	0	0	3<<	0	0	0	0	0	0	0
	. 0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	. 0	17	0	0	0	0	0	0	0	0	0	0	0	17
	. 0	17<<	0	0	0	0	0	0	0	0	0	0	0	2<<
1270.00	. 20	13	0	50	0	50	31	31	50	28	31	28	50	10
	. 13<<	1<<	0	10<<	0	10<<	0	0	0	3<<	5<<	0	2<<	0
	. 0	0	0	0	0	0	3<<	0	0	0	0	0	0	0
	. 0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	. 0	16	0	0	0	0	0	0	0	0	0	0	0	16
	. 0	18<<	0	0	0	0	0	0	0	0	0	0	0	2<<
1320.00	. 18	12	0	50	0	50	29	29	50	30	29	30	50	12
	. 11<<	1<<	0	10<<	0	9<<	0	0	0	5<<	5<<	0	4<<	0
	. 0	0	0	0	0	0	3<<	0	0	0	0	0	0	0
	. 0	0	0	0	0	0	0	0	0	0	1<<	0	0	0
	. 0	14	0	0	0	0	0	0	0	0	0	0	0	14
	. 0	14<<	0	0	0	0	0	0	0	0	0	0	0	2<<
1380.00	. 18	11	0	50	0	50	26	26	50	30	26	30	50	11
	. 11<<	1<<	0	10<<	0	10<<	0	0	0	3<<	2<<	0	4<<	0
	. 0	0	0	0	0	0	4<<	0	0	0	0	0	0	0
	. 0	0	0	0	0	0	0	0	0	0	3<<	0	0	0
	. 0	16	0	0	0	0	0	0	0	0	0	0	0	16
	. 0	15<<	0	0	0	0	0	0	0	0	0	0	0	2<<
1440.00	. 15	13	0	50	0	50	27	27	50	33	27	33	50	13
	. 9<<	0	0	10<<	0	10<<	0	0	0	3<<	3<<	0	7<<	0
	. 0	0	0	0	0	0	4<<	0	0	0	0	0	0	0
	. 0	0	0	0	0	0	0	0	0	0	2<<	0	0	0
	. 0	12	0	0	0	0	0	0	0	0	0	0	0	12
	. 0	16<<	0	0	0	0	0	0	0	0	0	0	0	2<<

COMPOUND LINK PARTS VS. TIME
****

AVERAGE EFFECTIVENESS USED, OVER ALL REPLICATIONS
(NOTE: IF CPL NOT WEAK, MORE CAPABILITY MAY HAVE BEEN AVAILABLE THAN WAS USED)

TIME .	1 .	2 .
0.00	1.00	1.00
11.00	.82	.65
61.00	.84	.61
121.00	.79	.58
190.00	.78	.59
240.00	.78	.55
310.00	.67	.36
370.00	.70	.46
420.00	.69	.45
480.00	.69	.45
530.00	.69	.47

730.00	.72	.52
780.00	.73	.45
840.00	.75	.46
910.00	.73	.42
960.00	.73	.47
1020.00	.74	.41
1090.00	.73	.44
1140.00	.70	.50
1200.00	.71	.50
1270.00	.72	.51
1320.00	.73	.45
1380.00	.72	.42
1440.00	.73	.40

SEGMENT RESULTS: CUMULATIVE TIMES WEAKEST VS. TIME

CHAIN #:	1 .	1 .	1 .	1 .	1 .
SEGMENT #:	1 .	2 .	3 .	4 .	5 .
TIME \ TYPE:	9 . +	1 . :	1 .	6 .	13 .
0.00	0	0	0	0	0
11.00	3	2	2	6	0
61.00	0	5	5	6	5
121.00	0	5	12	6	6
190.00	0	5	14	6	6
240.00	0	5	14	6	8
310.00	5	4	11	8	3
370.00	0	9	13	9	3
420.00	0	10	14	9	4
480.00	0	10	15	9	3
550.00	0	10	16	9	3
600.00	0	10	15	9	5
660.00	0	10	14	9	3
730.00	0	10	13	9	1
780.00	0	10	11	9	4
840.00	0	10	9	10	4
910.00	0	10	13	10	4
960.00	0	10	13	10	3
1020.00	0	10	14	10	4
1090.00	0	10	12	10	5
1140.00	0	10	14	10	2

1200.00	0	10	14	10	2
1270.00	0	10	16	10	2
1320.00	0	10	16	9	4
1380.00	0	10	15	10	4
1440.00	0	10	13	10	7

CHAIN RESULTS VS. TIME
••••••••••••••••••••••
AVERAGE EFFECTIVENESS
NO. OF TIMES STRONGEST
****

TIME	CHAINS 1
0.00	1.00
	50
11.00	.77
	47
61.00	.75
	50
121.00	.71
	50
190.00	.71
	50
240.00	.71
	50
310.00	.60
	44
370.00	.61
	48
420.00	.60
	48
480.00	.59
	48
550.00	.59
	48
600.00	.60
	48
660.00	.62
	48
730.00	.61
	48
780.00	.62

840.00	.	.63
	.	48
910.00	.	.60
	.	48
960.00	.	.61
	.	48
1020.00	.	.60
	.	48
1090.00	.	.61
	.	48
1140.00	.	.60
	.	48
1200.00	.	.60
	.	48
1270.00	.	.59
	.	48
1320.00	.	.60
	.	48
1380.00	.	.60
	.	48
1440.00	.	.61
	.	48

AVERAGED REPAIRS ON REPAIRABLE ITEMS

	DECON		LITE		MEDIUM	
ID	ORDERD	DONE	ORDERD	DONE	ORDERD	DONE
2			.70	.60	.35	.17
3			.66	.48	.29	.17

(NOTE: "ORDERD" INCLUDES ANY REORDERS OF DISCONTINUED REPAIRS)

RELIABILITY-TYPE FAILURES

ID		LITEFAIL	MED.FAIL	DEADFAIL
2	FKLFT	.607	.103	.068
3	CRANE	.521	.086	.040

END-OF-ENCOUNTER SUMMARY

	ASSET	.	INITIAL	UNHARMED	CONTAMD	LIT DAM	MED DAM
1	TRUCK	.	1.00	.81	0.00	0.00	0.00
2	FKLFT	.	1.00	.62	0.00	.06	.16
3	CRANE	.	1.00	.66	0.00	.04	.11

4	RADIO	1.00	.83	0.00	0.00	0.00
5	ALARM	2.00	1.70	0.00	0.00	0.00
6	TELE	1.00	.83	0.00	0.00	0.00
14	PARTS	100.00	94.58	0.00	0.00	0.00

(((RANDOM NUMBER SEEDS AT END = 869144629. 4733776. 612648773. 4999. 5999.)))

COMPUTER TIME FOR ENCOUNTER ... 18.088 SECONDS

MNEMONIC CONTROL CARDS
****

1. STOP

STOP READ BY INPUT ROUTINE. NORMAL STOP TAKEN
STOP CALLED FROM INPUT ROUTINE

```
  CONVENTIONAL LETHALITY DATA
  ***************************

WRHDICN
FKLFT,5
1,0.
1,OPEN
3,HEAVY,MEDIUM,LITE
1.,3.37,3.37,.3,15.06,15.06
1.,3.52,3.52,.3,47.19,47.19
1.,3.53,3.53,.3,47.88,47.88
TRK,5
1,0.
1,OPEN
3,HEAVY,MEDIUM,LITE
1.,3.42,3.42,.3,24.99,24.99
1.,3.52,3.52,.3,51.42,51.42
1.,3.53,3.53,.3,52.11,52.11
TALKY,5
1,0.
1,OPEN
1,INCAPACITATE
1.,2.96,2.96,.3,19.84,19.84
PERSONNEL,3
1,0.
2,OPEN,PRONE
1,INCAPACITATE
1.,13.06,13.06
1.0, 5.0,5.0
PARTS,3
1,0.
1,ONLY
1,INCAPACITATE
1.,7.69,7.69
END
```

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